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Visual Inspection
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Findley Lake Dam
Chautauqua County
Lake Erie
French Creek

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

The examination of the available documents and the visual inspection of the Findley Lake Dam did not reveal conditions which constitute an immediate hazard to human life or property. However,

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this dam has deficiencies which require further investigation and remedial action.

Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the dam would be overtopped for all storms exceeding approximately 20 percent of the PMF. The overtopping of the dam could cause the erosion of the embankment, especially around the outlet conduit, which would result in dam failure, thus significantly increasing the hazard to the loss of life, especially on the New York State highway which traverses its crest. To a lesser degree, there is also a potential loss of life by overtopping or breaching a downstream village street which is the only other connection between 2 halves of the Village. The spillway is, therefore, adjudged as "seriously inadequate" and the dam is assessed as unsafe, non-emergency.

The classification of "unsafe" applied to a dam because of a "seriously inadequate" spillway is not meant to connote the same degree of emergency as would be associated with an "unsafe" classification applied for a structural deficiency. It does mean that there appears to be a serious deficiency in spillway capacity and if a severe storm were to occur, overtopping and failure of the dam could take place, significantly increasing the hazard to loss of life downstream of the dam.

Secondly, some of the deficiencies which were observed during the field inspection can be mitigated by the following remedial actions:

1) Develop and implement a warning system to notify downstream property owners and necessary governmental agencies in the event of impending dam overtopping.

2) Develop and implement a formal plan and line of responsibility for manipulating the outlet stoplogs during times of high runoff.

3) Clean the existing debris from the vicinity of the outlet structure and implement a plan which will assure that such maintenance is accomplished in a routine manner in the future. This should include provisions for regular and periodic maintenance, inspection, and updating of the warning, operation and maintenance plans.

4) Modify the existing operation plan to provide for removal of all stoplogs in times of "flood" conditions; provided that additional analyses demonstrate that the resulting lowered water levels and increased flow velocities will not aggravate the already precarious condition of the outlet structure (or spillway).

The first three of these actions should be completed by the owners within 90 days after receiving this report. The investigation which must precede modification of the operation plan should be initiated and completed in such time as will permit modification of the Operation Plan no later than the first spring season after the owners have received this report.

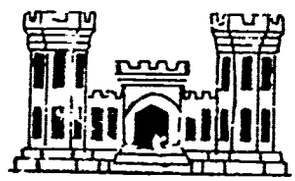
LAKE ERIE BASIN

FINDLEY LAKE DAM

CHAUTAUQUA COUNTY, NEW YORK

INVENTORY NO. N.Y. 752

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM



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Prepared for

DEPARTMENT OF THE ARMY

NEW YORK DISTRICT, CORPS OF ENGINEERS

NEW YORK, NEW YORK

SEPTEMBER 1980

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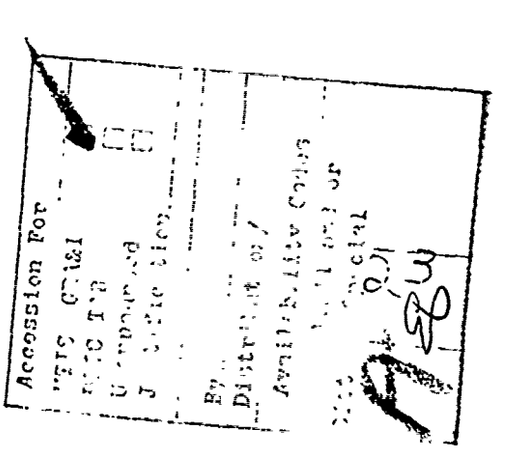
PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.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(11) 26 Sep 80 (10) Bert L. Williamson
Gary L. Wood

(6) PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
FINDLEY LAKE DAM (Inventory No. NY
[redacted] N.Y. 752)
LAKE ERIE BASIN
CHAUTAUQUA COUNTY, NEW YORK
Phase I Inspection Report

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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

NAME OF DAM:	Findley Lake Dam Inventory No. N.Y. 752
STATE LOCATED:	New York
COUNTY:	Chautauqua
RIVER BASIN:	Lake Erie
WATERSHED:	French Creek
STREAM:	Unnamed
DATE OF INSPECTION:	May 7 and 13, 1980

ASSESSMENT

The examination of the available documents and the visual inspection of the Findley Lake Dam did not reveal conditions which constitute an immediate hazard to human life or property. However, this dam has deficiencies which require further investigation and remedial action.

Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the dam would be overtopped for all storms exceeding approximately 20 percent of the PMF. The overtopping of the dam could cause the erosion of the embankment, especially around the outlet conduit, which would result in dam failure, thus significantly increasing the hazard to the loss of life, especially on the New York State highway which traverses its crest. To a lesser degree, there is also a potential loss of life by overtopping or breaching a downstream village street which is the only other connection between 2 halves of the Village. The spillway is, therefore, adjudged as "seriously inadequate" and the dam is assessed as unsafe, non-emergency.

The classification of "unsafe" applied to a dam because of a "seriously inadequate" spillway is not meant to connote the same degree of emergency as would be associated with an "unsafe" classification applied for a structural deficiency. It does mean that there appears to be a serious deficiency in spillway capacity

and if a severe storm were to occur, overtopping and failure of the dam could take place, significantly increasing the hazard to loss of life downstream of the dam.

Secondly, some of the deficiencies which were observed during the field inspection can be mitigated by the following remedial actions:

1) Develop and implement a warning system to notify downstream property owners and necessary governmental agencies in the event of impending dam overtopping.

2) Develop and implement a formal plan and line of responsibility for manipulating the outlet stoplogs during times of high runoff.

3) Clean the existing debris from the vicinity of the outlet structure and implement a plan which will assure that such maintenance is accomplished in a routine manner in the future. This should include provisions for regular and periodic maintenance, inspection, and updating of the warning, operation and maintenance plans.

4) Modify the existing operation plan to provide for removal of all stoplogs in times of "flood" conditions; provided that additional analyses demonstrate that the resulting lowered water levels and increased flow velocities will not aggravate the already precarious condition of the outlet structure (or spillway).

The first three of these actions should be completed by the owners within 90 days after receiving this report. The investigation which must precede modification of the operation plan should be initiated and completed in such time as will permit modification of the Operation Plan no later than the first spring season after the owners have received this report.

Finally, it is necessary that additional studies be undertaken to evaluate:

a) The structural integrity of the principal spillway

b) Detailed hydrologic/hydraulic conditions using site specific characteristics of the drainage basin

c) The stability of the existing embankment

These studies should be initiated within 90 days after the owners have received notification of the contents of this report; and should be completed in sufficient time to permit any required construction during the following construction season. There are other remedial actions which should be completed within the next construction season, but which may warrant modification as a result of the studies. These are:

5) Repair or replace the existing outlet structure

6) Repair the timber and concrete reinforcing on the upstream face of the embankment

7) Reinforce the areas of erosion on the downstream face of the embankment and on the west bank of the downstream channel.

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APPROVED BY

Colonel W. M. Smith, Jr.
New York District Engineer

View of upstream face from west
side-timber wall embankment
extends from left of photo to gate
structure in center and concrete
trace from gate to building

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
FINDLEY LAKE DAM
I. D. NO. N.Y. 752
LAKE ERIE BASIN
CHAUTAUQUA COUNTY, NEW YORK

SECTION 1: PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase I Inspection Report was authorized by the New York State Department of Environmental Conservation by Contract No. D-201458. This study was performed in accordance with the terms of the above contract and the Recommended Guidelines for Safety Inspection of Dams prepared by the Department of the Army; Office of the Chief of Engineers to fulfill the requirements of the National Dam Inspection Act, Public Law 92-327.

b. Purpose of Inspection

This inspection was conducted to obtain available data concerning design and construction of the dam, to evaluate that data, to visually inspect existing conditions at the dam, to identify and evaluate deficiencies and/or hazardous conditions which may threaten life and property of the residents downstream of the dam and to recommend remedial measures to mitigate such deficiencies and hazardous conditions.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam

The Findley Lake dam consists of an earth embankment

with a vertical upstream face which is reinforced for a distance of 84 feet on the eastern end with concrete and timbers (railroad ties), and the western 64 feet with timber (railroad ties) lagging between steel uprights. The eastern portion of this upstream face is stepped with a 10" wide "tread" at elevation 1419.35. The top step raises above this tread a height of 3.8 feet and the lower one drops from 0.1 feet at the eastern end of the embankment, to 6.2 feet where it adjoins the spillway.

The dam embankment is wedge-shaped, having a maximum height of 10 feet and a crest width that varies but is nominally 52 feet. In length, the crest varies between 150 feet along the upstream face and about 120 feet at the embankment to downstream slope contact.

The downstream face of the embankment is a relatively flat slope as depicted on Drawings 2, 3, & 4 in Appendix E which were drawn from a survey which was made as part of the field inspection of this dam. The surface of the slope is covered with vegetation which is primarily weeds. There has been some erosion of the downstream slope on the west side of the outlet structure. This has been reinforced with riprap to minimize further erosion (see photo in Appendix A).

The spillway consists of a concrete box conduit which passes through the embankment and intersects the upstream face at an angle of 84 degrees. This intake structure is 5.6 feet wide inside. The exact height could not be determined due to the amount of debris accumulated in the invert of the conduit at the intake. Sketches received from the Town of Mina Highway Superintendent indicate this height to be 6.9 feet. However, the 1915 Dam Report submitted to the State of New York Conservation Commission shows the height (I.D.) to be

6.0 feet. Both of these documents are included in Appendix D.

The reservoir level is controlled by wood stoplogs which are placed in the spillway conduit and are raised by a chain hoist. There are provisions for stoplogs at both the inlet and outlet ends, but only the inlet control is in use. There are no emergency or auxiliary spillways nor was there any evidence observed of a reservoir drain or an internal drainage system.

b. Location

The Findley Lake Dam is located near the center of the Village of Findley Lake, New York. New York State Routes No. 426/430 traverse the dam crest.

c. Size Classification

According to field measurements the dam has a maximum height above the reservoir bottom of 10 feet and has a storage capacity of 1275 acre-feet between normal summer pool and top of the dam. The structure, is therefore, in the intermediate size category as defined by the Corps of Engineers, Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification

A New York State highway (Routes 426 & 430) traverses the crest of this earth embankment. In the event of overtopping, this highway would be submerged and if a dam breach should occur it is obvious that the highway would also be lost. In addition, there is a village street approximately 1000 feet downstream where the stream passes through a pipe culvert. There are also several residences and a school immediately downstream but the visual inspection of the area, along with a review of the U.S.G.S. topographic map, indicates that these structures are probably above the flood elevation.

Based upon the potential consequences of the loss of the State Highway, and to a lesser degree the village street which is the only other connection between two halves of the village, this structure is considered a high hazard.

e. Ownership

The dam is owned and operated by the Findley Lake Property Owner's Association who purchased "the water rights, dam site, and old saw mill" from Mr. Larry Schwartz, the former saw mill owner, in 1946. Dr. E. B. Howard is the current President of the Association. His mailing address is Findley Lake, New York.

f. Purpose of Dam

The present purpose of the dam is to impound a recreational lake.

g. Design and Construction History

The dam was reportedly constructed in 1820 to supply water for generating power at a saw mill which was located on the downstream side of the dam. It was reputed to have been extensively repaired or reconstructed during 1903. No actual work on the dam itself has been done since at least 1946 with the exception of replacing the wood stoplogs. In 1970-71, New York State Department of Transportation rebuilt State Route No. 426/430 which traverses the dam crest. In the Fall of 1979 it was necessary to replace all wood stoplogs and part of the outlet structure after they were destroyed by a malicious explosion.

h. Normal Operational Procedures

Normal flows are discharged over the wooden stoplogs through the principal spillway. The operational procedure established by the owner is as follows:

April 15 - October 15	All stoplogs in place to hold the reservoir level at 1421.0

October 15-November 21	Top 3 stoplogs removed to within 31 inches above the base of spillway. Reservoir level at 1417.9
November 21-March 15	Top 2 stoplogs removed to within 47 inches above the base of spillway. Reservoir level at 1419.3
March 15-April 15	Top stoplog removed to within 52 inches above the base of spillway. Reservoir level at 1419.7

The high water level is considered to be when the reservoir is at elevation 1421.42 which corresponds to 5 inches above the top stoplog.

Based on this plan the reservoir has sufficient capacity to store and discharge 20 percent of the PMF without overtopping the dam.

1.3 OPERATION RECORDS

No operation records are maintained. The reservoir level is maintained at various elevations during the year depending on the season (as previously described). During heavy runoff the top stoplog is removed when the reservoir level exceeds elevation 1421.42. If the reservoir level exceeds elevation 1421.75 the top two stoplogs are removed until the reservoir reaches the normal pool elevation for that particular season. The Board of Directors of the Findley Lake Property Owner's Association are responsible for operating the gate stoplogs.

1.4 PERTINENT DATA

a. Drainage Basin

Area (sq. miles)	5.1
Length (miles)	2.27

b. Reservoir Surface (acres)

Normal Summer Pool (elevation 1421)	330
Top of Dam (elevation 1424.3)	370

c. Elevations (ft. above MSL, based on the U.S.G.S. benchmark having elevation 1429)

Top Of Dam	1424.3
Invert of Outlet Structure (upstream)	1415±
Invert of Outlet Structure (downstream)	1412.2
Stoplog for Normal Summer Pool (4/15-10/15)	1421.0
Stoplog for Normal Fall Pool (10/15-11/21)	1417.9
Stoplog for Normal Winter Pool (11/21-3/15)	1419.3
Stoplog for Normal Spring Pool (3/15-4/15)	1419.7
Top of Outlet Structure (inside, upstream)	1422.27

d. Storage (acre-feet)

At Outlet Invert (elevation 1415) - Could not be determined	
Between Summer Pool and Top of Intake Structure	500
Between Summer Pool and Top of Dam	1275

e. Discharge at Damsite (cfs)

Water Surface at	Corresponding Elevation	Discharge with Stoplogs at 1	2
High Water	1421.42	5	230
"Flood" level	1421.75	52	250
Top of Outlet Structure	1422.0	78	270
Top of Embankment	1425.3	177	550

Condition 1 is with stoplogs removed according to the operational procedure described in Article 1.2.h.

Condition 2 is with all stoplogs removed for all flows.

f. Dam

Type: Earth Embankment with vertical concrete and timber reinforced upstream faces

Length: (ft.)	Varies between 120 & 150
Height: (ft.)	10
Top Width: (ft.)	52±
Side Slopes: Upstream	Vertical
Downstream (V:H)	Varies between 1:1.5 & 1:2.5
Zone:	Unknown

Impervious Core:	Unknown
Cutoff:	Unknown

g. Principal Spillway

Type: Concrete Box Conduit, 5.6 feet wide x 6.0 or 6.9 feet high (inside dimensions at the intake end)

Length of Weir: (ft.)	5.6
Length of Spillway: (ft.)	81
Crest Elevation: (also see subsection "c. Elevations")	1415.35

Control: Manually placed wood stoplogs

h. Auxiliary Spillway	None
i. Reservoir Drain	None

SECTION 2: ENGINEERING DATA

2.1 GEOTECHNICAL DATA

a. General Geology

The Findley Lake Dam in the Village of Findley Lake, Chautauqua County, New York is located at the northern end of a man-made lake situated on the northernmost flank of the Appalachian Plateau physiographic province. The terrain surrounding the lake (nominal surface elevation 1421) includes hills rising to elevations of 1600 to over 1700 feet, seperated by narrow sharply-defined ravines and valleys. These hills and valleys, and the Findley Lake basin itself, are elongated in a northwest-southeast trend, this being the result of Pleistocene glaciation and the associated advance of the continental ice sheet in this direction. The last ice sheet is known to have advanced and receded several times in southwestern New York State; in fact, the Findley Lake Moraine represents the limit of one such advance.

Due to the position of the area near such an end moraine, local geology may be complex and highly variable over short distances. Commonly, one encounters glacial till formed by deposition of material from the melting glacial ice; this ablation till is usually more granular and of higher permeability than an underlying basal (lodgement) till. Also common are ice-contact deposits of stratified granular material, and more recent fluvial and alluvial deposits in active stream channels.

The local bedrock consists of interbedded shales and sandstones of Upper Devonian age. These strata are essentially horizontal. Although there are no known active faults in this region, it is within a zone 3 of seismic probability as defined by the Corps of Engineer Guidelines.

b. Subsurface Investigation

There is no information available on the subsurface or embankment materials.

2.2 DESIGN RECORDS

The dam was designed around the year 1820 and no design data are available. However, sketches were made in 1915 as part of the "Dam Report" submitted to the New York State Conservation Commission. In addition, sketches of the intake gate were obtained from the Town of Mina Highway Superintendent. These drawings are part of the documents the Findley Lake Property Owner's Association use in their operational Procedure. Finally, a survey was made of the dam and principal spillway during the Phase I visual inspection. Based on this survey and available sketches, a composite plan of the damsite was prepared. All drawings are included in Appendix E.

2.3 CONSTRUCTION RECORDS

No construction records are available. Cursory details of construction are shown on the drawings contained in Appendix E.

2.4 EVALUATION OF DATA

The data presented in this report has been compiled from information received from George Bradley, the current Town of Mina Highway Superintendent, and from the files of the New York State Department of Environmental Conservation. Although these data are adequate for a Phase I report, they are inadequate in at least the following respects:

a) There is no information available on the area and storage of the lake at various elevations below normal summer pool.

b) There is no information on the material comprising the embankment or the foundation on which it is supported.

The following discrepancies have been found in the available data:

a) The elevation of the U.S.G.S. Benchmark on the southwest foundation wall of the U.S. Post Office in Findley Lake, New York is stamped elevation 1429 whereas the U.S.G.S. 7 1/2 minute topographic map of the Clymer, New York quadrangle shows this benchmark to be at elevation 1428. The U.S.G.S. description of this benchmark lists its elevation 1427.965. The 1429 figure was used as the basis of this report.

b) The height of the principal spillway gate was noted to be 6.0 feet on the 1915 dam report and 6.9 feet on the drawings by the Findley Lake Property Owner's Association (both of these documents are attached to this report in Appendix D).

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General

The visual inspection of Findley Lake Dam was conducted on May 7 and 13, 1980. The weather at the time of these inspections was clear with temperature in the 70's. The reservoir level and tailwater were at elevations 1421.12 and 1412.09 respectively, on May 13, 1980.

b. Embankment

The crest of the dam is covered with an asphaltic concrete roadway having a width of 30 feet. Evidence of embankment or spillway movement was detected on either side of the principal spillway box conduit. This was in the form of transverse cracks paralleling the spillway that were observed in the asphaltic pavement. Also, the concrete facing on the upstream slope was badly deteriorated east of the spillway intake gate. The timber facing west of the spillway gate has moved laterally toward the reservoir a maximum distance of about 2 feet near the center of this section. A depression has developed in the embankment as a result of this timber wall movement. It appeared as though there has been some "loss of ground" associated with this depression.

Erosion has occurred along the downstream slope west of the principal spillway outlet. This section has been lined with riprap to minimize future erosion. The cause of this slope erosion appears to be from surface water runoff discharged through an 18 inch C.M.P. which extends from a catch basin along the north side of the roadway.

Another 6 inch C.M.P. outlets east of the spillway outlet structure on the downstream slope. The origin of this pipe could not be determined. No discharge was observed from either pipe on the dates of the visual inspection.

The location of the two pipes as well as the catch basin referred to above are shown on Drawing No. 1, Plan of Damsite in Appendix E.

c. Spillway

The spillway consists of a concrete box conduit. The inlet invert is at elevation 1415.35 (this elevation if of no significance under the present operating procedures, however, as the stoplogs are never removed below elevation 1417.9) and the exit invert at the outlet structure is at elevation 1412.20. The inside dimensions are 5.6 feet wide by a height which is reportedly between 6.0 and 6.9 feet and could not be field-determined, as previously noted. At the exit, the spillway is 9.4 feet high. The outlet orifice of the spillway is 7.1 feet wide by 5.5 feet high.

The box conduit is provided with internal lateral bracing (or struts) through steel members which, at the time of the visual inspection, were so badly rusted that the entire webs of these members were missing. In addition, temporary wood vertical cribbing and laterial support had been provided. These are depicted on Drawing No. 5 in Appendix E.

The concrete within 2 feet of the base of the spillway is badly deteriorated. In one location near the exit orfice and along the east wall, a hole has developed through the concrete which is about 8-10 inches in diameter. Numerous structural cracks were also observed in the sidewalls. Details of the internal bracing and the limits of the vertical cribbing and wood bracing, as well as the geometry of the principal spillway, are shown in the Drawings contained in Appendix E.

d. Downstream Channel

The downstream channel immediately beyond the principal spillway is littered with numerous concrete slabs and foundations from the former saw mill. The west bank of the outlet channel has an average slope of 1 vertical on 2 horizontal and is grass covered except for the toe of the slope. The toe of this slope about 2 feet above the tailwater elevation was not vegetated and is slightly steeper due to erosion.

The eastern side of the outlet channel has a gentle slope of about 5 to 10 percent.

e. Reservoir Area

Many residences surround the reservoir on gentle to moderate slopes. No signs of distress or slope instability were observed. It is reported that the water supply to many of the residences is from shallow wells and the water in the wells is controlled by the reservoir level.

3.2 EVALUATION

The visual inspection of this dam revealed the following deficiencies:

1) Structural cracking of concrete in the spillway
2) Possible settlement of the embankment adjacent to the spillway conduit
3) Deteriorated concrete and structural bracing on the inside of principal spillway
4) Loss of ground and possible stability problems of the timber wall on the western end of the upstream face
5) Deteriorated concrete on the upstream face of the embankment
6) Debris in the reservoir in the vicinity of the outlet structure (spillway) as well as within the invert
7) Erosion of downstream slope west of the spillway
8) Slight erosion of outlet channel along west bank

SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

The normal reservoir level is controlled by the number of stoplogs in place on the intake end of the spillway conduit. The normal reservoir level fluctuates between a Fall low elevation 1417.9 and the Summer high at elevation 1421.0. Downstream flows are limited by the flow through this structure which is capable of passing the discharge for storms up to 20 percent Probable Maximum Flood using the operational procedure presently in use and as described in Section 1.3.

4.2 MAINTENANCE OF DAM

The responsibility for maintenance of this dam is with the owner--the Findley Lake Property Owner's Association. Other than replacing the stoplogs in the gate structure following their destruction in the Fall of 1979, it is reported by the Highway Superintendent of the Town of Mina that little to no maintenance has been done on the dam since at least 1946.

4.3 WARNING SYSTEM IN EFFECT

There is no warning system in effect.

4.4 EVALUATION

The present procedures for operation and control of this structure are judged to be inadequate. First, there is no formal procedure or backup system for assuring that the stoplogs are removed during periods of heavy runoff. Furthermore, the fact that the bottom two stoplogs are always left in place restricts the ability of the outlet conduit to pass flood flows (this was found to be 20% of the PMF). The hydrologic/hydraulic analyses predict that removal of all of the stoplogs would allow the conduit to pass one-half of the PMF before the dam would be overtopped. This measure cannot be recommended, however, until an

evaluation has been made of the effect that the new stress conditions which would result from the lowered lake level would have on the embankment itself as well as the spillway conduit which is already in distress. Furthermore, consideration must be given to the ability of the culvert under the Village street to pass these additional flows and to the need for an energy dissipator at the outlet of the spillway to prevent erosion under such increased flows.

Also there is no apparent stipulated procedure for either routine or emergency maintenance such as removal of debris from the spillway intake.

Finally, as evidenced by conditions outlined in Section 3.2, the dam is in obvious need of repair.

SECTION 5: HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

Delineation of the watershed draining into the reservoir pool area was made using the U.S.G.S. 7.5 minute quadrangles for Clymer and South Ripley, New York. The drainage area measures 5.1 square miles and consists predominatly of wooded land along with some open fields. The relief in the area consists of moderate to steep sloped hills that surround the reservoir to the east, west and south.

5.2 ANALYSIS CRITERIA

The analysis of the floodwater retarding capability of this dam was performed using the Corps of Engineers HEC-1 computer program, Dam Safety Version. This program develops an inflow hydrograph based upon the "Snyder Synthetic Unit Hydrograph" and then uses the "Modified Puls" flood routing procedure. The spillway design flood selected for analysis was the PMF in accordance with the Recommended Guidelines of the U.S. Army Corps of Engineers.

5.3 SPILLWAY CAPACITY

The Findley Lake Dam has only one spillway which is a concrete box structure fitted for removable stoplogs at both the inlet and discharge ends. Since the reputed operational procedure is to use stoplogs in the inlet end only and to manipulate the upper three (thus always leaving the lower 31" in place),these were the conditions assumed in the initial analysis. Furthermore, this structure is 5.6' in width and, while there is some uncertainly regarding the height, it was taken to be 6.9' for these analyses. Finally, these analyses were based on a measured summer pool elevation of 1421.0 which was based on the datum stamped on the U.S.G.S. Benchmark (1429) as the zero storage elevation. The remainder of the Stage-Storage Curve was based on the area of the water surface and the 1430 contour of the U.S.G.S. Topographic Map.

Under these conditions, the spillway does not have sufficient capacity for discharging the peak outflow from either the Probable Maximum Flood (PMF) or one-half the PMF. For the PMF, the peak inflow is 13,375 cfs and the peak outlfow is 9,758 cfs. For one-half the PMF, the peak inflow is 6,688 cfs and the peak outlfow is 3,189 cfs. The computed spillway capacity for a water surface elevation at the top of dam is only 177 cfs.

A second analysis was made using the alternate assumption that all of the stoplogs are removed. Under these conditions, the computed peak outflow from the PMF is 6,765 cfs and that for one-half of the PMF is 510 cfs. The computed spillway capacity under this situation is 550 cfs.

5.4 RESERVOIR CAPACITY

Storage capacity of the reservoir between elevation 1421 and the top of the dam is 1,275 acre-feet which is equivalent to a runoff depth of 4.68 inches of rain over the entire drainage area.

5.5 FLOODS OF RECORD

No information regarding maximum reservoir height or flood of record could be found.

5.6 OVERTOPPING POTENTIAL

Analysis using the PMF and one-half the PMF indicates that the dam does not have sufficient spillway capacity. For a PMF peak outflow of 9,758 cfs and the existing operating procedures, the dam would be overtopped to a computed depth of some 4.7 feet. At the outflow for one-half PMF (3,189 cfs) the overtopping would be by approximately 2.5 feet; and the dam would be overtopped by all flows exceeding 20% of the PMF.

Under the alternative computation which assumed that all stoplogs are removed, the peak outflow at full PMF of 6,765 cfs causes overtopping of about 3.7 feet and the dam would be overtopped only by flows exceeding 50 % of the PMF.

5.7 EVALUATION

The spillway has the capacity to pass only 20% of the PMF under the current operating program. While removal of all of the stoplogs would increase the hydraulic capacity such that 50% of the PMF could be passed without overtopping; this procedure is not recommended at this time for reasons which are discussed in the following section.

Therefore, this structure is judged to meet the three criteria set forth in paragraph 5 of the Corps of Engineers ETL 1110-2-234 and the spillway is considered to be seriously inadequate and unsafe, non-emergency.

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

The visual inspection revealed several conditions which may be potentially unstable, particularily during and immediately following periods of heavy runoff. The movement of the upstream timber wall section of the dam and the associated "loss of ground" behind the wall is a problem and represents a significant hazard during high water. The structural cracking pattern in the spillway conduit may indicate a serious foundation problem. The combination of the structural cracking and surface cracks in the pavement adjacent to the spillway may be the manifestation of "loss of ground" along the sides and/or base of the spillway. If piping has occurred a dam breach due to underseepage is possible regardless of the reservoir level.

b. Stability Analysis

There are no data available regarding embankment materials and their strength parameters, foundation conditions, seepage cutoff or drainage, and configuration of the embankment below the water surface on the upstream side. Therefore, it is not possible to perform stability analyses as part of a Phase I investigation which is limited to visual inspection and use of existing data of record.

c. Seismic Stability

Findley Lake is situtated in a Zone 3 of seismic probability as defined by the Corps of Engineers Guidelines and should, therefore, be subjected to a seismic evaluation. Since there are no data available which can be used to evaluate the static stability, however, such an evaluation is impossible as a part of the current assessment.

d. Additional Investigations

It is recommended that the following investigations be made of the structural stability (in order of priority):

- Structural integrity of the spillway conduit including the culvert material, the possibility of underseepage and concomitant loss of support, as well as lateral stresses and vertical support at various reservoir levels.
- Stability of the embankment considering seepage, changed stress conditions resulting from varying lake levels, and erosion potential resulting from either overtopping or increased discharge through the spillway.

SECTION 7: ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

The Phase I inspection of the Findley Lake Dam revealed conditions which constitute a potential hazard to human life and property. The spillway is hydraulically "seriously inadequate" under the present operating procedures since the dam would be overtopped by all storms exceeding 20 percent of the PMF. Potential structural instability of the timber wall section of the upstream face as well as the principal spillway further reduces the integrity of this structure.

The hazard to human life downstream appears to be low. However, a dam failure would result in the loss of the State Highway, and possibly a village street, both of which could constitute a high potential for loss of human life. Therefore, this structure is assessed as seriously inadequate, unsafe, non-emergency.

b. Adequacy of Information

The information reviewed for Phase I inspection purpose is limited and contains discrepancies which effect the hydrologic/hydraulic analyses; and preclude the possibility of a meaningful evaluation of the structural stability.

c. Need for Additional Investigations

As a minimum, it is recommended that the following conditions be investigated:

a) Structural integrity of the principal spillway to evaluate the causes of:

- o Structural cracking of concrete in the spillway
- o Possible settlement of the embankment adjacent to the spillway conduit
- o Deteriorated concrete and structural bracing on the inside of principal spillway

b) Detailed hydrologic/hydraulic using site specific characteristics of drainage basin

c) Permeability, drainage, and stability of the earth embankment including:

- o Loss of ground and possible stability problems of the timber wall on the western end of the upstream face

d. Urgency

Within 90 days after receiving notification, the owner should have the studies underway to investigate the three problems which are indentified above. These studies should be completed in sufficient time to permit any required construction during the following construction season.

7.2 RECOMMENDED REMEDIAL MEASURES

a. The following remedial measures must be undertaken:

1) Develop and implement a warning system to notify downstream property owners and necessary governmental agencies in the event of impending dam overtopping.

2) Develop and implement a formal plan and line of responsibility for manipulating the outlet stoplogs in times of high runoff. This should include back-up personnel to cover for the unavailability of the primary operator(s).

3) Clean the existing debris from the vicinity of the outlet structure and implement a plan which will assure that such maintenance is accomplished in a routine manner in the future. This must also include:

- o Deteriorated concrete on the upstream face of the embankment
- o Erosion of downstream slope west of the spillway
- o Slight erosion of outlet channel along west bank

4) Modify the existing operation plan to provide for removal of all stoplogs in times of "flood" conditions; provided that additional analyses demonstrate that the resulting lowered water levels and increased flow velocities will not aggravate the already precarious condition of the spillway

Since the outlet structure (spillway) and the embankment both exhibit signs of existing distress; the studies outlined in Section 7.1.c. should be completed prior to undertaking the following remedial actions which may be modified as a result of the studies:

5) Repair or replace the existing spillway
6) Repair the timber and concrete reinforcing on the upstream face of the embankment
7) Reinforce the areas of erosion on the downstream face and on the west bank of the downstream channel

b. Urgency

Items 1 thourgh 3 enumerated in the previous section should be completed within 90 days after the owners have received notification of the contents of this report. The evaluation required for item 4 should be completed in such time as to permit the required modification of the operational plan as rapidly as possible; but certainly not later than the first spring season after the owners have been notified. Finally, the remaining recommendations will be dependent upon the results of the studies undertaken in response to Section 7.1.c. and the corrective measures should be completed as described in Section 7.1.d.

o o o

APPENDIX A

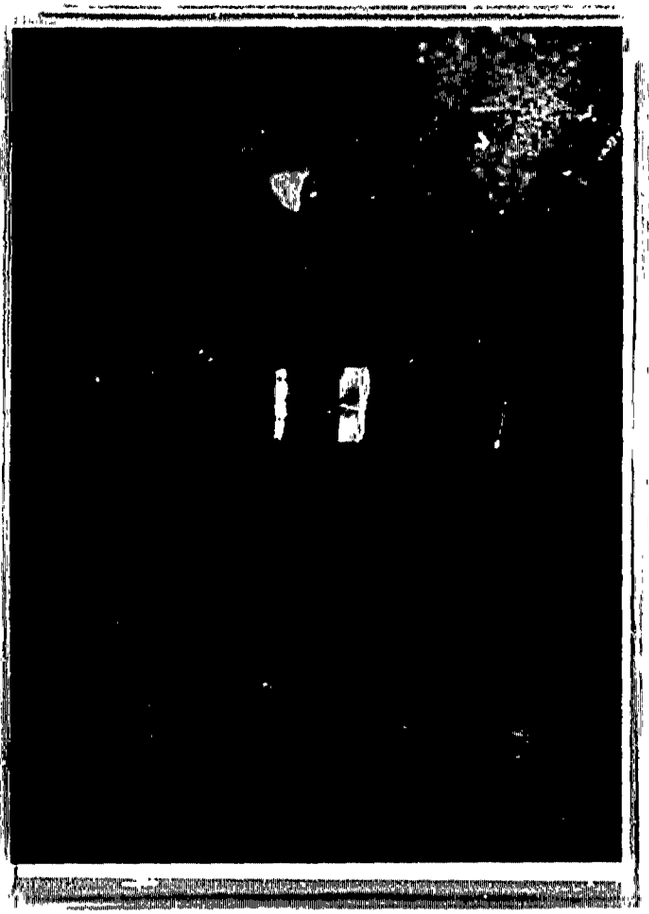
PHOTOGRAPHS

View of gate structure looking down from the top-note trash lodged on right side.

View of upstream from east bank with outlet gate structure towards left side of photo.

View of upstream face from west side-timber wall embankment extends from left of photo to gate structure in center and concrete trace from gate to building.

Downstream view of spillway outlet. Note rip-rap under CMP drainage pipe.

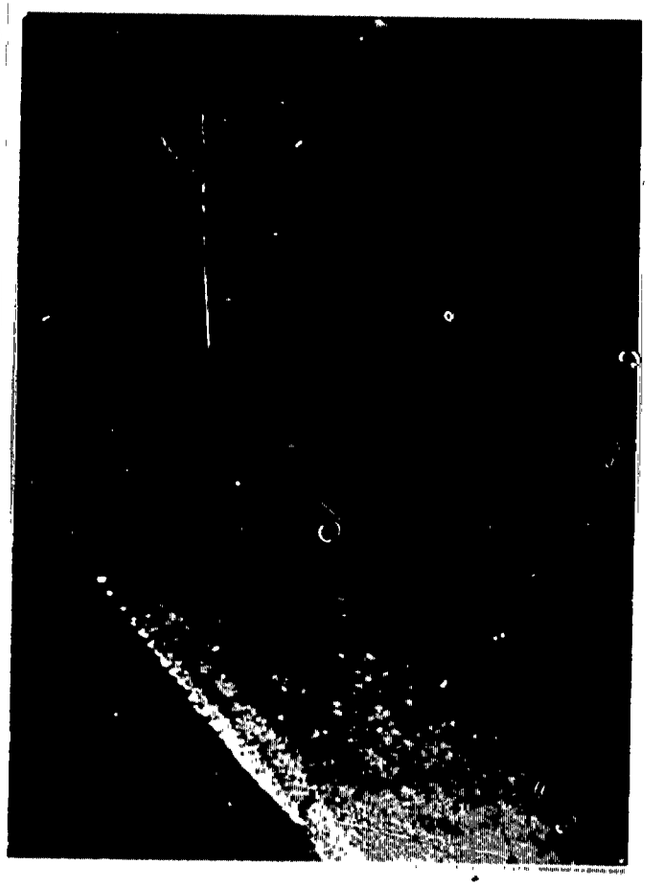


View looking upstream inside outlet structure. Note timber cribbing, rusted steel struts, and cracks in concrete.

Deteriorated concrete on inside of east wall of the outlet structure near the exit.

Cracks in pavement over outlet structure.

View of downstream channel from west abutment. Concrete on left is remenant of former mill foundations.



View of cracked concrete on inside of westwall of outlet structure near exit.

APPENDIX B

VISUAL INSPECTION CHECKLIST

THOMSEN ASSOCIATES

CONSULTING GEOTECHNICAL ENGINEERS & GEOLOGISTS

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam *Findley Lake*

Fed. I.D. # *NY-959* DEC. Dam No. *117-752*

River Basin *Erie*

Location: Town *Mina* County *Chautauqua*

U.S.G.S. Quadrangle *Clymer*

Stream Name *Unnamed*

Tributary of *West Branch French Creek*

Latitude (N) *42° 07.1'* Longitude (W) *79° 44.1'*

Type of Dam *Earth Embankment, Concrete on Upstream Slope*

Hazard Category *Low*

Date(s) of Inspection *5/12/80, 5/13/80*

Weather Conditions *Clear & Windy*

Reservoir Level at Time of Inspection *1421.12*

Tailwater Level at Time of Inspection *1412.09*

b. Inspection Personnel *Charles T. [illegible] [illegible] Associates*

Paul Ehrie[illegible] & Charles F. White - McFarland-Johnson Engineers Inc

c. Persons Contacted (Including Address & Phone No.) *Town of Mina - Highway Supt.*

[illegible] (716-769-7194)

E.B. Howard, Pres.- Findley Lake Owner's Association Findley Lake, N.Y.

d. History: *No [illegible] of [illegible] 1946*

Date Constructed *≈1820* Date(s) Reconstructed *1903*

N.Y.S. D.O.T. Rebuilt Rt. 430 in 1970-1971

Designer *Unknown*

Constructed by *L.F. Swartz - former owner of Dam for Saw Mill*

Owner *Findley Lake Owner's Association*

e. Seismic Zone *Zone 3*

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VISUAL INSPECTION CHECKLIST

2) Embankment

a. Characteristics

1) Embankment Material: Unknown - Principal Glacial Deposit in Vicinity is (Wkg) Ice-contact stratified drift

2) Cutoff Type: Unknown - None Suspected

3) Impervious Core: Unknown - None Suspected

4) Internal Drainage System: None

5) Miscellaneous:

b. Crest

1) Vertical Alignment: OK

2) Horizontal Alignment: OK

3) Surface Cracks: Cracks in Pavement indicate settlement around outlet structure

4) Miscellaneous:

c. Upstream Slope

1) Slope (Estimate) (V:H): Vertical with 10" step located 3.3' below top of concrete

2) Undesirable Growth or Debris, Animal Burrows: None

3) Sloughing, Subsidence or Depressions: Backfill Subsidence Lot - Abutment behind Retaining Wall

Cracking - Note: This section is not part of the dam

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1) Erosion at Contact Est. Abutment Protection at 3' CMP - Riprap has been placed below Pipe

2) Seepage Along Contract NONE observed

3) Drainage System

a. Description of System NONE

b. Condition of System

c. Discharge from Drainage System

4) Instrumentation (Momumentation/Surveys, Observation Wells, Weirs, Piezometers, Etc.) NONE

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4) Slope Protection Stone Masonry, Bank deteriorated near Spillway

5) Surface Cracks or Movement at Toe Unobservable

d. Downstream Slope

1) Slope (Estimate - V:H) Left Side 1:2 Right Side 1:3

2) Undesirable Growth or Debris, Animal Burrows NONE

3) Sloughing, Subsidence or Depressions Erosion From Drainage Runoff East Side of Spillway. [illegible] 8" [illegible] area has riprap.

4) Surface Cracks or Movement at Toe NONE

5) Seepage NONE

6) External Drainage System (Ditches, Trenches; Blanket) NONE

7) Condition Around Outlet Structure Many former foundations from Saw Mill just downstream from outlet structure

8) Seepage Beyond Toe NONE

e. Abutments-Embankment Contact

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VISUAL INSPECTION CHECKLIST

5) Reservoir

a. Slopes Very Gentle ≈ ≤ 5%

b. Sedimentation 3"-4" over entire

c. Unusual Conditions Which Affect Dam Many Homes surrounding Reservoir with shallow water wells

6) Area Downstream of Dam

a. Downstream Hazard (No. of Homes, Highways, etc.) Road use. 2 8' ϕ CMP downstream channel ≈ 800 ft. downstream of dam

b. Seepage, Unusual Growth Heavy growth in downstream channel

c. Evidence of Movement Beyond Toe of Dam none

d. Condition of Downstream Channel Heavy Growth of Brush beyond ≈150' from Dam

7) Spillway(s) (Including Discharge Conveyance Channel)

a. General Weir controlled by wood stoplogs operated in chain links

b. Condition of Service Spillway Bad Concrete Badly deteriorated from base to ≈2' above base. Concrete broken in small irregular pieces in places

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VISUAL INSPECTION CHECKLIST

c. Condition of Auxiliary Spillway None

d. Condition of Discharge Conveyance Channel Many boulders from former saw mill in outlet channel just downstream of outlet structure

8) Reservoir Drain/Outlet None

Type: Pipe _____ Conduit _____ Other _____
Material: Concrete _____ Metal _____ Other _____
Size: _____ Length _____
Invert Elevations: Entrance _____ Exit _____
Physical Condition (Describe): Unobservable _____
Material: _____
Joints: _____ Alignment _____
Structural Integrity: _____
Hydraulic Capability: _____
Means of Control: Gate _____ Valve _____ Uncontrolled _____
Operation: Operable _____ Inoperable _____ Other _____
Present Condition (Describe): _____

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9) Structural

a. Concrete Surfaces Dam Facing is Badly Deteriorated near gate, Conc. conduit spillway is badly deteriorated from base to ≈2' above base

b. Structural Cracking Many cracks in Conduit Spillway Outlet

c. Movement - Horizontal & Vertical Alignment (Settlement) Internal Cribbing & Bracing in Conduit Spillway Outlet but no movement observed. Evidence of Embankment Settlement around Conduit - Cracking in Asphaltic Concrete Pavement

d. Junctions with Abutments or Embankments

e. Drains - Foundation, Joint, Face NONE

f. ~~Water Passages~~, Conduits, ~~Sluices~~ Principal Spillway is concrete conduit MIN. inside dimensions 5.6' wide by 9.4' high

g. Seepage or Leakage

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h. Joints - Construction, etc. Badly Deteriorated near base of Principal Spillway

i. Foundation

j. Abutments

k. Control Gates Wood - Stop logs, Note: Channels for Stop logs are Rusted and Stop logs were destroyed by an explosion in 1979

l. Approach & Outlet Channels

m. Energy Dissipators (Plunge Pool, etc.)

n. Intake Structures

o. Stability

p. Miscellaneous

APPENDIX C

HYDROLOGIC/HYDRAULIC ENGINEERING DATA AND COMPUTATIONS

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CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

AREA-CAPACITY DATA:

		Elevation (ft.)	Surface Area (acres)	Storage Capacity (acre-ft.)
1)	Top of Dam	1424.3	370	1275
2)	Design High Water (Max. Design Pool)	1421.75		
3)	Auxiliary Spillway Crest	None		
4)	Pool Level with ~~Flashboards~~ stoplogs	1417.9 to 1421.0 - area & capacity varies		
5)	Service Spillway Crest	1421.0	330	Assumed Zero

DISCHARGES

		Volume (cfs)
1)	Average Daily	No Records
2)	Spillway @ Maximum High Water (1422.0)	78
3)	Spillway @ Design High Water (1421.75)	52
4)	Spillway @ Auxiliary Spillway Crest Elevation	n/a
5)	Low Level Outlet	none
6)	Total (of all facilities) @ Maximum High Water	Same as 2
7)	Maximum Known Flood	No Records

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OUTLET STRUCTURES/EMERGENCY DRAWDOWN FACILITIES:

Type: Gate_____ Sluice _____ Conduit V Penstock_____

Shape: Rectangular - see Dwg. #5, App. E for details

Size: 5.6' wide by 6.0 or 6.9 feet deep (inside)

Elevations: Entrance Invert_____

Exit Invert _____

Tailrace Channel: Elevation _____

HYDROMETEROLOGICAL GAGES:

Type: Rainfall Gauge

Location: Findley Lake, N.Y.

Records:

Date - Records Available from JAN. 1977 to Present

Max. Reading - 4.32" Sept. 14, 1979

For More Info. Contact: Walter Filipkowski
Box 47, Findley Lake, N.Y. 14736

FLOOD WATER CONTROL SYSTEM:

Warning System: None

Method of Controlled Releases (mechanisms):

Manually inserted stoplogs

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CREST: ELEVATION: 1424.3

Type: Earthen with paved highway

Width: 52 feet Length: 120 to 150 feet

Spillover No provisions

Location

SPILLWAY:

PRINCIPAL		EMERGENCY
See Outlet Structure	Elevation	
	Type	
	Width	
	Type of Control	
	Uncontrolled	
	Controlled:	
	Type (Flashboards; gate)	
	Number	
	Size/Length	
	Invert Material	
	Anticipated Length of operating service	
	Chute Length	
	Height Between Spillway Crest & Approach Channel Invert (Weir Flow)	

None

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DRAINAGE AREA: 5.1 Sq. Mi.

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: primarily wooded - some open fields

Terrain - Relief: moderate to steep

Surface - Soil: glacial tills

Runoff Potential (existing or planned extensive alterations to existing surface or subsurface conditions)

unlikely to change

Potential Sedimentation problem areas (natural or man-made; present or future)

not significant

Potential Backwater problem areas for levels at maximum storage capacity including surcharge storage:

none

Dikes - Floodwalls (overflow & non-overflow) - Low reaches along the Reservoir perimeter:

Location: none

Elevation:

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SCALE

Drainage Area - 5.1 sq. mile

Estimation of Lag time (t_p)

L = 2.7 mile   Lc = 0.6 mile (Length of reservoir from the stream outlet to the dam was added in computing above L, in accordance with suggestion from N.Y. Dist. Corps of Engineers.)

$t_p = C_t(.955)(L \cdot L_c)^{.3} + .25 t_{R}$
$= 1.77(.955)(2.7 \times .6)^{.3} + .25(.5)$
$= 2.08$ hr.

For HEC-1 input $t_p = 2.08$ hr. & $C_p = 0.63$ were used to develop Snyder's unit hydrograph.

Probable Maximum Precipitation

From: Hydrometeorological Report No 33;
Probable Maximum Precipitation = 22.8 in.
(For 200 sq. Mi. - 24 hr. duration)

Depth - Area - Duration Relationship (Zone 2)

6 hr = 116 %
12 hr = 127 %
24 hr = 141 %

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Stage Discharge Computation

Normal Pool Elevation = 1421.0
Elevation Top of Spillway = Varies (see below)
Elevation Top of Dam = 1424.3
Elevation of Tailwater = 1412.1

Size of outlet Box = 5.6'X6.9' (width (height))
Length of Box = 81'
Elev of Inlet Box = 1415.35
Orifice Size = 3'x5'-6" (applies only at stages above 1421.0)

Assumptions:

① Discharge thru the spillway was calculated as weir flow ($Q = CLH^{3/2}$, $C = 3.1$) up to an elevation of 1422.0, at stages above 1422.0 spillway flow was converted by orifice control where $Q = CA\sqrt{2gH}$, $C = .7$

② Normal Pool Elevation was assumed to be the normal summer pool elevation of 1421.0, the stage-storage data was computed from this elevation

③ The spillway elevation is 1421.0 until the lake level exceeds the high water level of 1421.42 then the top gate is removed from the side gates and the new corresponding spillway elevation becomes 1419.66, if the lake level continues to rise another elevation of 1421.75 (Flood Level) the second gate is then removed until the high water level is reached, the spillway elevation corresponding to this condition is 1419.27 (see sketch of side view of spillway)

④ Bureau of Public Roads Hydraulic Engineering Circular #5 was used to compute headwater.

⑤ In computing flow over the top of the dam the broad crested weir formula was used $Q = CLH^{3/2}$ and the coefficient weir 'C' was 3.1

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Stage - Discharge Computation

Elev.	Stage	Weir/ Orifice Flow	Inlet Control		Outlet Control			Control	Weir (Broad Crest)			Total Discharge
			HW/D	HW	$\frac{d+t}{2}$	H	HW	HW	H	Length	Discharge	
ft.	ft.	cfs		ft.	ft.	ft.	ft.	ft	ft.	(ft.)	(cfs)	(cfs)
1421	0	0									0	0
1421.42	.42	Control (Weir) 4.7	–	–	–	–	–	–	–	–	–	4.7
1421.75	.75	Control (Weir) 52.0	.38	2.62	4.15	off chart	.20	2.62	–	–	–	52
1422.0	1.0	Control (Weir) 78.3	.50	.45	4.35	.53	.93	3.45	–	–	–	78.3
1423.4	2.4	Control (Orifice) 153	.63	4.36	4.85	2.0	2.9	4.36	–	–	–	153
1424	3.0	169.6	.68	4.70	4.95	2.5	3.5	4.70	–	–	–	169.6
1424.3	3.3	177.3	.685	4.74	5.00	2.9	4.0	4.74	–	–	–	177.3
1425	4.0	194.1	.74	5.12	5.15	3.2	4.4	5.12	.7	140	254.2	448.3
1428	7.0	235	.83	5.74	5.30	5.0	6.35	6.35	3.7	250	5515	5750
1430	9.0	255	.90	6.22	5.45	5.85	7.35	7.35	5.7	320	13,500	13755

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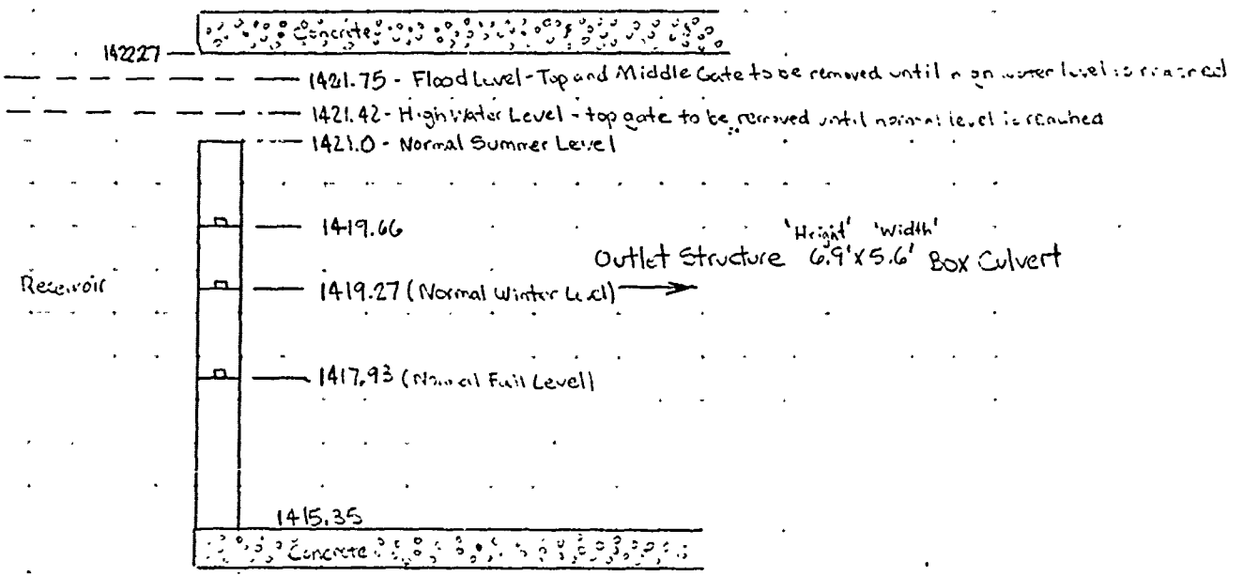
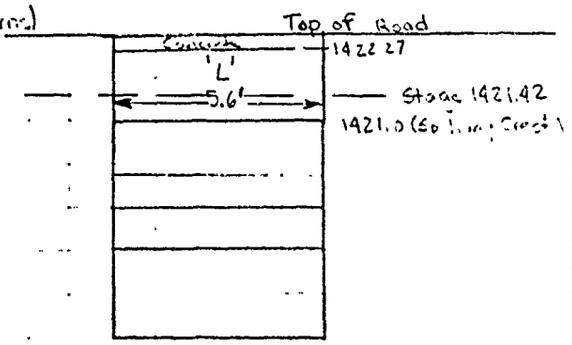
Side View of Spillway showing gate sections and water levels



Sample Calculations

Stage 1421.42 (High Water Level) (Weir flow Governs)



$Q = CLH^{3/2}$

$Q = 3.1(5.6')(.42)^{3/2}$

$Q = 4.7$ cfs

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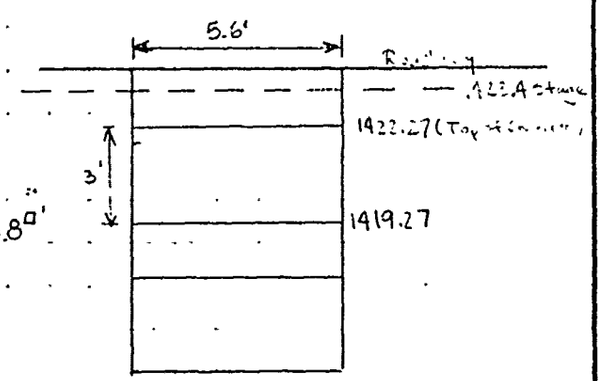
Sample Calculations (cont.)



Stage 1423.4 (orifice flow governs)

$Q = cA\sqrt{2gH}$ $c = .7$ Area $= 5.6' \times 3' = 16.8\square'$

$Q = .7(16.8)\sqrt{2(32.2)(2.163)}$

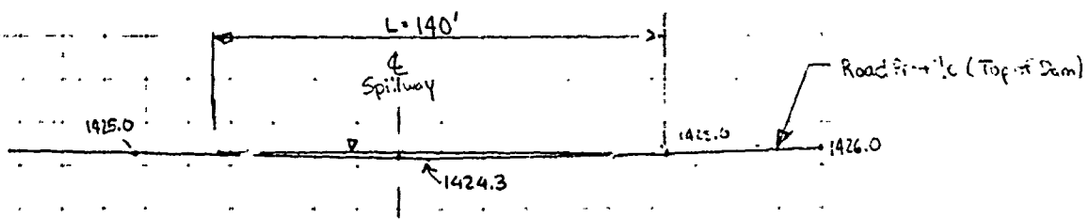
$Q = 153$ cfs

Flow over Roadway (Stage @ 1425)

$Q = CLH^{3/2}$

$Q = 3.1(140)(.7)^{3/2}$

$Q = 254$ cfs



C-5

FORM 204-1 Available from AEC Inc. Groton Mass. 01450

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JOB _____

SHEET NO _____ OF _____

CALCULATED BY _____ DATE _____

CHECKED BY _____ DATE _____

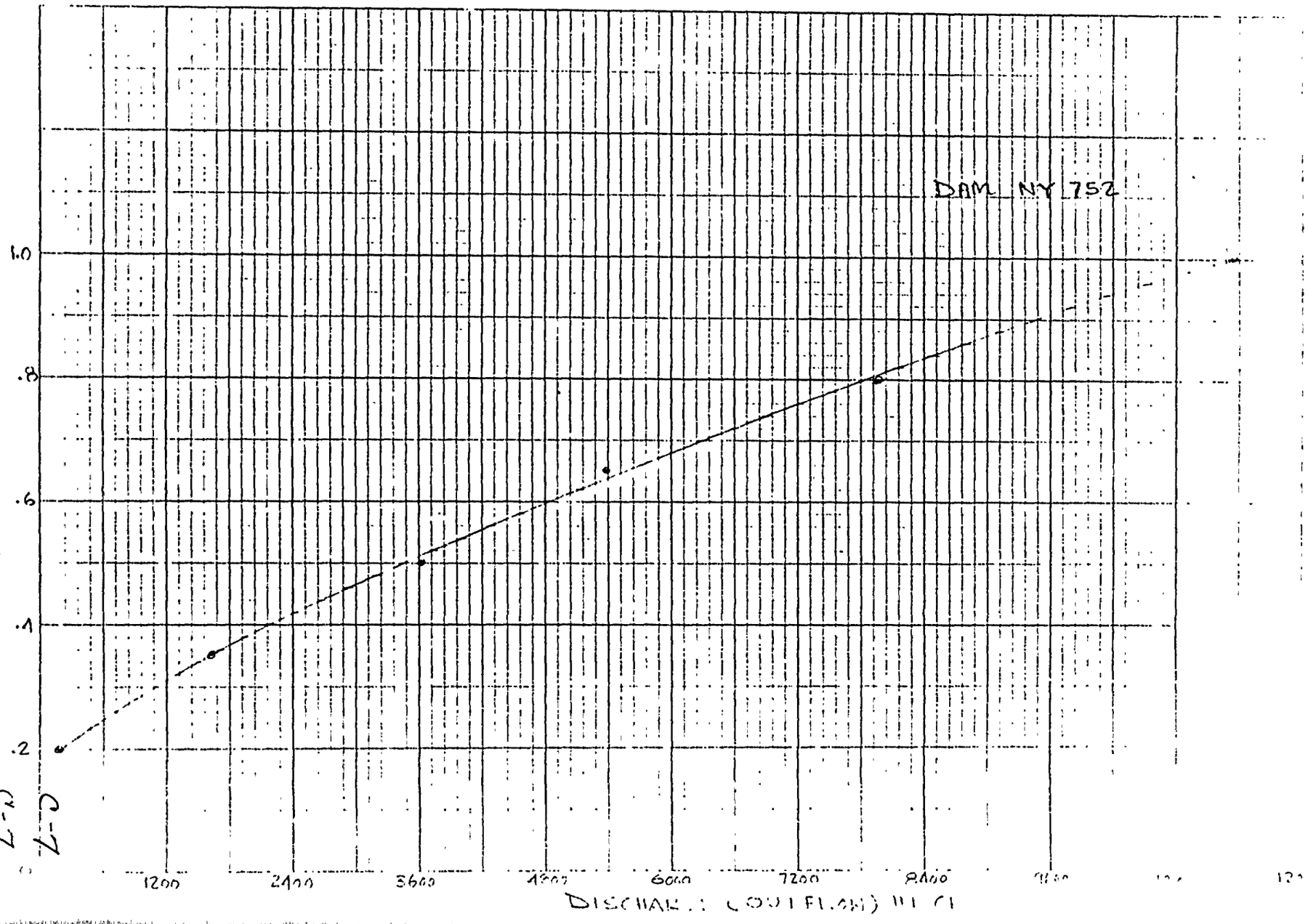
SCALE _____

Stage - Storage Data

Elevation (ft.)	Surface Area (Acres)	Avg. Area (Acres)	Incremental Storage (Acre-ft.)	Total Storage (Acre-ft.)	Remarks
1421	330				Surface areas were measured from the USGS quadrangle for Clymer, New York
1430	447	333.5	3496.5	3496.5	

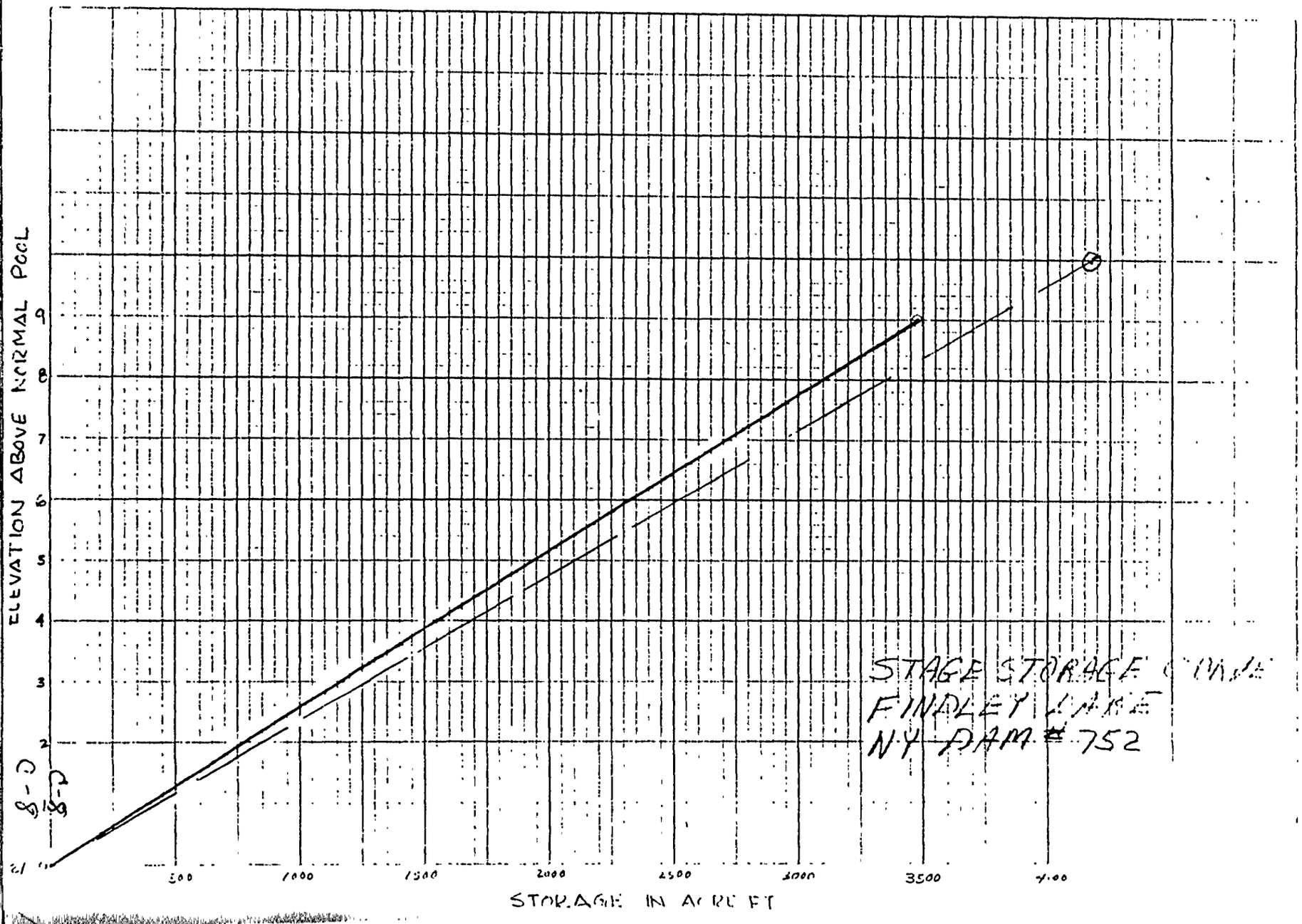
FORM 534-1 Available from NCHES Inc. Groton Mass 01450

K&E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO MADE IN U.S.A.



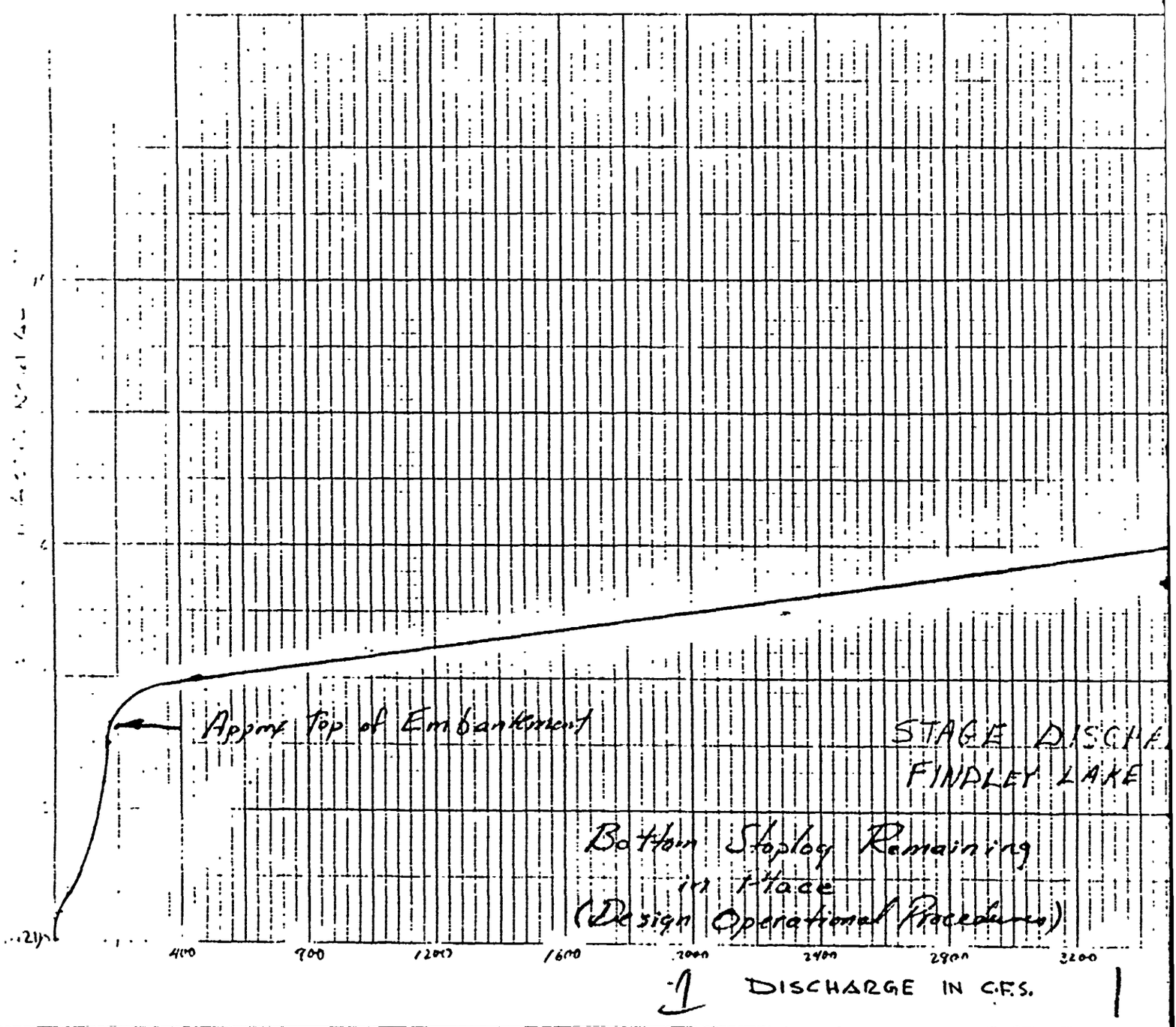
L-2
L-3

K-E 10 X 10 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO MADE IN U.S.A.

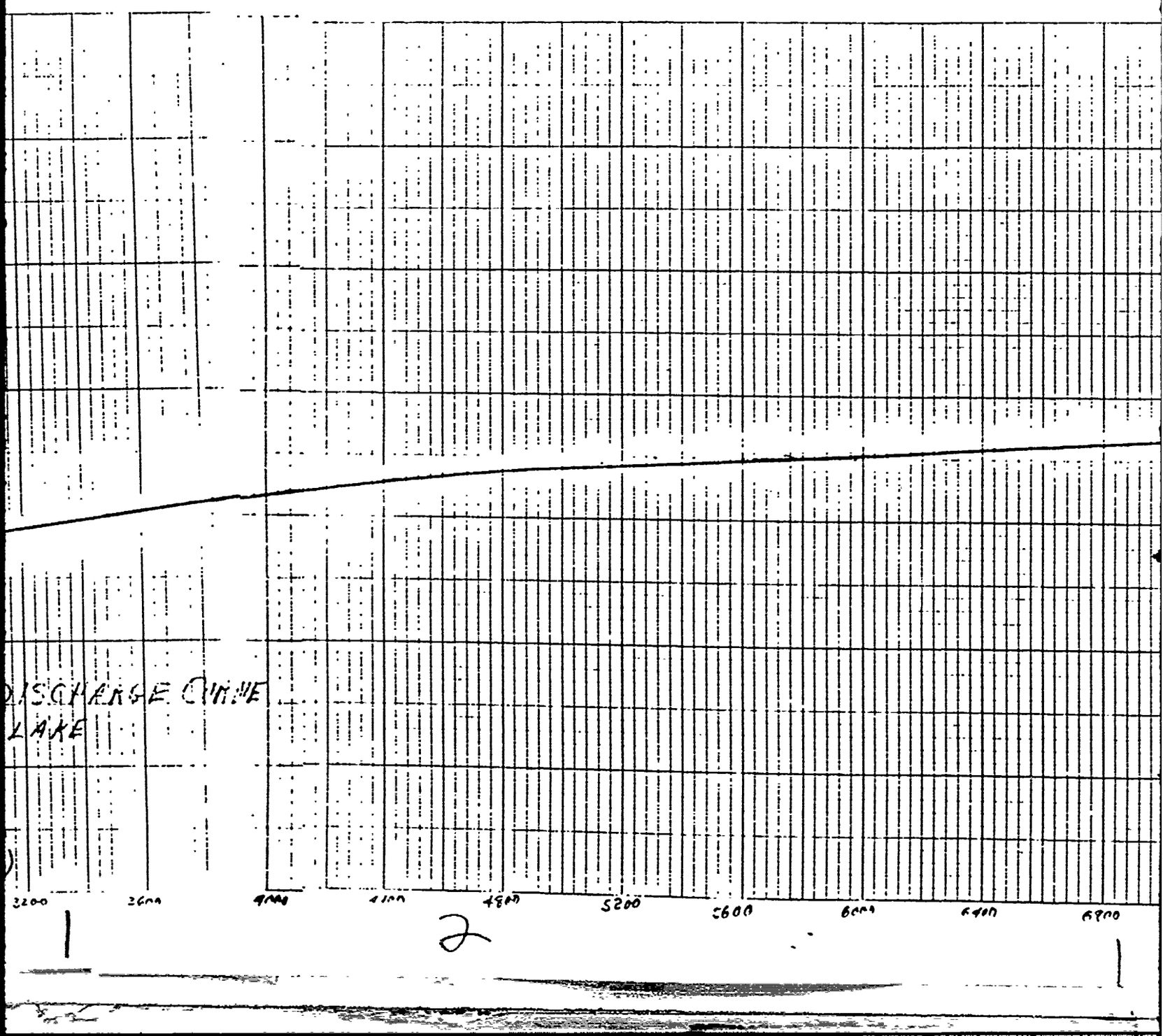


10 X 10 TO THE INCH
KEUFFEL & ESSER CO.

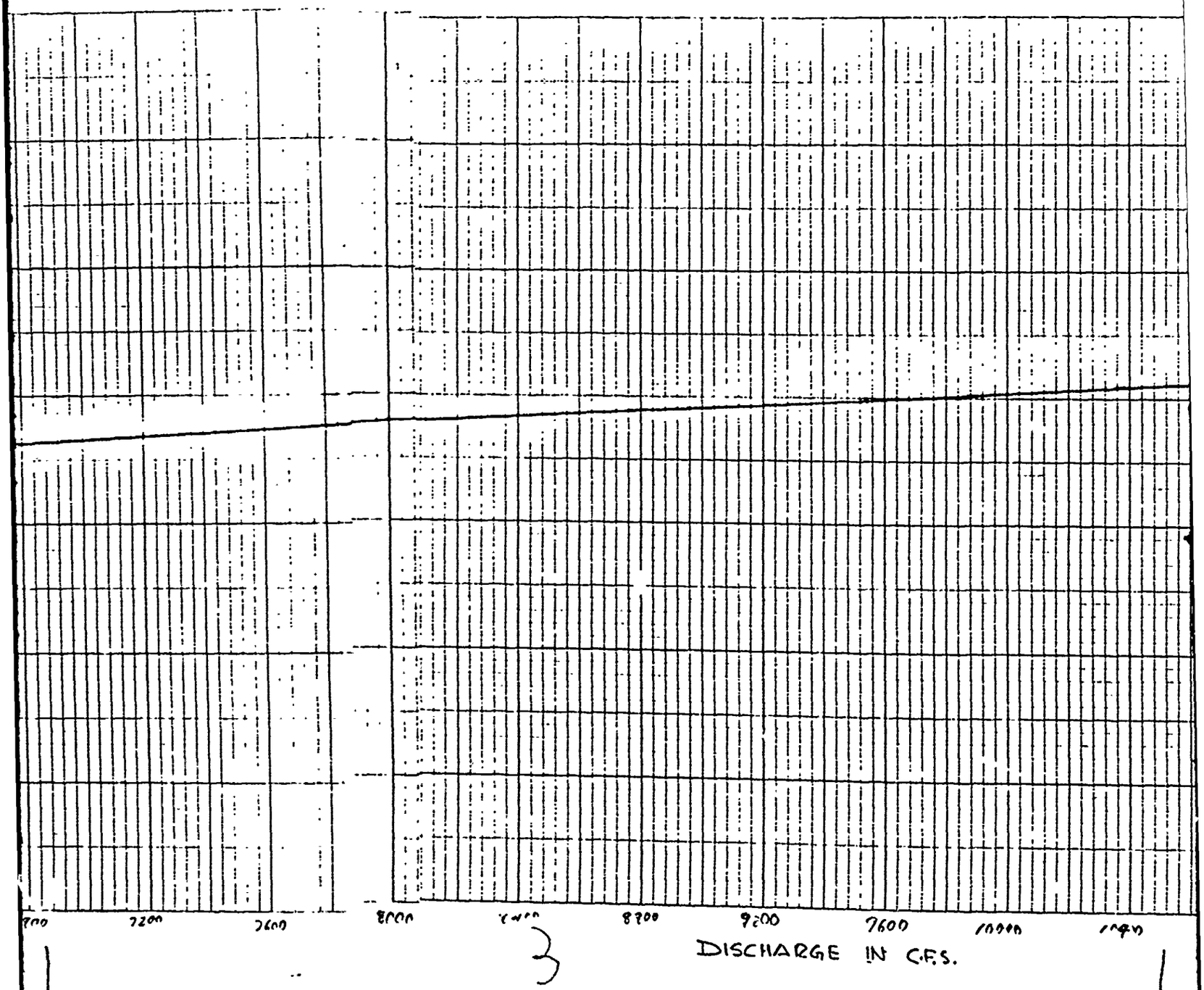
46 0782



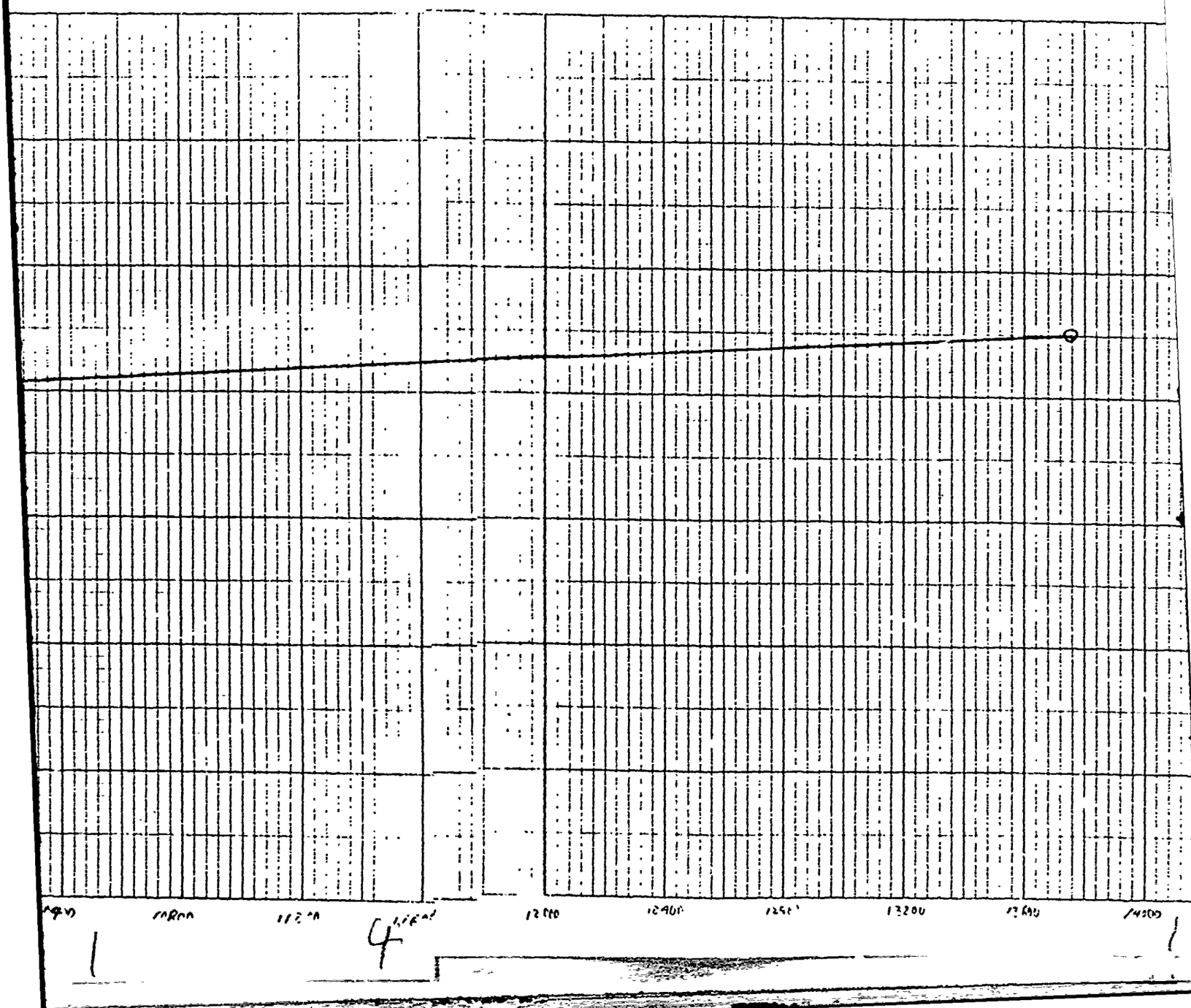
46 0782


DISCHARGE CURVE
LAKE
3200
3600
4000
4400
4800
5200
5600
6000
6400
6800

10 X 10 TO THE INCH • KEUFFEL & ESSER CO. MADE IN U.S.A.



46 0782



10 X 10 TO THE INCH
KEUFFEL & ESSER CO.

46 0782

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**********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  20 FEB 79
**********************************
    1                 A1
    2                 A2
    3                 A3
    4                 B     150         0         30         0         0         0         0         0         0         0
    5                 B1      5
    6                 J       1         0          1
    7                 J1     .2       .35        .50       .05       .80         1
    8                 K       0         1          0         0         0         0         1
    9                 K1
   10                 M       1         1        5.1         0       5.1         0         0         0         0         0
   11                 P       0      22.5        116       127       141         0         0         0         0         0
   12                 T       0         0          0         0         0         0         1        .1         0         0
   13                 H   2.06       .03
   14                 X      -2        -.1          2
   15                 K       1         2          0         0         0         0         1         0         0         0
   16                 K1
   17                 Y       0         0          0         1         1
   18                 Y1      1         0          0         0         0         0        -1
   19                 Y2      0       170        290       390       930      1160      1280      1550      2710    3496.5
   20                 Y3      0       4.7         52      78.3       153     169.6     177.3     448.3    5750.0   13755.0
   21                 K      99
```

ANALYSIS OF DAM OVERTOPPING USING RATIOS OF PMF

HYDROLOGIC-HYDRAULIC ANALYSIS OF SAFETY OF MY 752

RATIOS OF PMF ROUTED THROUGH THE RESERVOIR

CALCULATION OF INFLOW HYDROGRAPH

ROUTING OF INFLOW HYDROGRAPH

PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

RUNOFF HYDROGRAPH A1	1
ROUTE HYDROGRAPH TO	2
END OF NETWORK	

****
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION JULY 1978
LAST MODIFICATION 28 FEB 79
****

TIME OF EXECUTION 22-AUG-80 13:26:54

ANALYSIS OF DAM OVERTOPPING USING RATIOS OF PMF
HYDROLOGIC-HYDRAULIC ANALYSIS OF SAFETY OF NI 752
RATIOS OF PMF ROUTED THROUGH THE RESERVOIR

JOB SPECIFICATION

NW	NMIN	METRIC	IPLT	IPRT	NSTAN
150	30	0	0	0	0

JOPER	NWT	LROPT	TRACE
5	0	0	0

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 6 LRTIO= 1
RTIOS= 0.20 0.35 0.50 0.65 0.80 1.00

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

CALCULATION OF INFLOW HYDROGRAPH

ISTAG	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	5.10	0.00	5.10	0.00	0.000	0	0	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.80	116.00	127.00	141.00	0.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.500

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRIL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.10	0.00	0.00

UNIT HYDROGRAPH DATA
TP= 2.08 CP=0.63 NTA= 0

RECESSION DATA
STRTQ= -2.00 QRCSN= -0.10 RTIOR= 2.00
APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 5.02 AND R= 3.64 INTERVALS

UNIT HYDROGRAPH 22 END-OF-PERIOD ORDINATES, LAG= 2.09 HOURS, CP= 0.64 VOL= 1.00

100.	309.	680.	925.	956.	852.	646.	490.	372.	282.
214.	162.	123.	93.	71.	54.	41.	31.	23.	18.
13.	10.								

0 END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	0.30	1	0.09	0.00	0.09	10.
1.01	1.00	2	0.09	0.00	0.09	9.
1.01	1.30	3	0.09	0.00	0.09	8.
1.01	2.00	4	0.09	0.00	0.09	8.
1.01	2.30	5	0.09	0.00	0.09	7.
1.01	3.00	6	0.09	0.00	0.09	7.
1.01	3.30	7	0.09	0.00	0.09	6.
1.01	4.00	8	0.09	0.00	0.09	6.
1.01	4.30	9	0.09	0.00	0.09	5.
1.01	5.00	10	0.09	0.00	0.09	5.
1.01	5.30	11	0.09	0.00	0.09	5.
1.01	6.00	12	0.09	0.01	0.08	5.
1.01	6.30	13	0.17	0.12	0.05	19.
1.01	7.00	14	0.17	0.12	0.05	64.
1.01	7.30	15	0.17	0.12	0.05	145.
1.01	8.00	16	0.17	0.12	0.05	254.
1.01	8.30	17	0.17	0.12	0.05	368.
1.01	9.00	18	0.17	0.12	0.05	466.
1.01	9.30	19	0.17	0.12	0.05	540.
1.01	10.00	20	0.17	0.12	0.05	597.
1.01	10.30	21	0.17	0.12	0.05	639.
1.01	11.00	22	0.17	0.12	0.05	671.
1.01	11.30	23	0.17	0.12	0.05	696.
1.01	12.00	24	0.17	0.12	0.05	714.
1.01	12.30	25	1.06	1.01	0.05	816.
1.01	13.00	26	1.06	1.01	0.05	1148.
1.01	13.30	27	1.27	1.22	0.05	1783.
1.01	14.00	28	1.27	1.22	0.05	2669.
1.01	14.30	29	1.59	1.54	0.05	3749.
1.01	15.00	30	1.59	1.54	0.05	4821.
1.01	15.30	31	1.93	1.88	0.05	5858.
1.01	16.00	32	6.11	6.06	0.05	7312.
1.01	16.30	33	1.48	1.43	0.05	9365.
1.01	17.00	34	1.48	1.43	0.05	11491.
1.01	17.30	35	1.16	1.11	0.05	12991.
1.01	18.00	36	1.16	1.11	0.05	13375.
1.01	18.30	37	0.13	0.08	0.05	12537.
1.01	19.00	38	0.13	0.08	0.05	11006.
1.01	19.30	39	0.13	0.08	0.05	9329.
1.01	20.00	40	0.13	0.08	0.05	7601.
1.01	20.30	41	0.13	0.08	0.05	5994.
1.01	21.00	42	0.13	0.08	0.05	4669.
1.01	21.30	43	0.13	0.08	0.05	3664.
1.01	22.00	44	0.13	0.08	0.05	2902.
1.01	22.30	45	0.13	0.08	0.05	2324.
1.01	23.00	46	0.13	0.08	0.05	1885.
1.01	23.30	47	0.13	0.08	0.05	1545.
1.02	0.00	48	0.13	0.08	0.05	1320.
1.02	0.30	49	0.00	0.00	0.00	1232.
1.02	1.00	50	0.00	0.00	0.00	1149.
1.02	1.30	51	0.00	0.00	0.00	1072.
1.02	2.00	52	0.00	0.00	0.00	1001.
1.02	2.30	53	0.00	0.00	0.00	934.
1.02	3.00	54	0.00	0.00	0.00	871.
1.02	3.30	55	0.00	0.00	0.00	813.
1.02	.0	56	0.00	0.00	0.00	758.
1.02	4.30	57	0.00	0.00	0.00	708.
1.02	5.00	58	0.00	0.00	0.00	660.
1.02	5.30	59	0.00	0.00	0.00	616.
1.02	14.00	76	0.00	0.00	0.00	190.
1.02	14.30	77	0.00	0.00	0.00	177.
1.02	15.00	78	0.00	0.00	0.00	165.
1.02	15.30	79	0.00	0.00	0.00	154.
1.02	16.00	80	0.00	0.00	0.00	144.
1.02	16.30	81	0.00	0.00	0.00	134.
1.02	17.00	82	0.00	0.00	0.00	125.
1.02	17.30	83	0.00	0.00	0.00	117.
1.02	18.00	84	0.00	0.00	0.00	109.
1.02	18.30	85	0.00	0.00	0.00	102.
1.02	19.00	86	0.00	0.00	0.00	95.
1.02	19.30	87	0.00	0.00	0.00	88.
1.02	20.00	88	0.00	0.00	0.00	83.
1.02	20.30	89	0.00	0.00	0.00	77.
1.02	21.00	90	0.00	0.00	0.00	72.
1.02	21.30	91	0.00	0.00	0.00	67.
1.02	22.00	92	0.00	0.00	0.00	63.
1.02	22.30	93	0.00	0.00	0.00	58.
1.02	23.00	94	0.00	0.00	0.00	54.
1.02	23.30	95	0.00	0.00	0.00	51.
1.03	0.00	96	0.00	0.00	0.00	47.
1.03	0.30	97	0.00	0.00	0.00	44.
1.03	1.00	98	0.00	0.00	0.00	41.
1.03	1.30	99	0.00	0.00	0.00	38.
1.03	2.00	100	0.00	0.00	0.00	36.
1.03	2.30	101	0.00	0.00	0.00	34.
1.03	3.00	102	0.00	0.00	0.00	31.
1.03	3.30	103	0.00	0.00	0.00	29.
1.03	4.00	104	0.00	0.00	0.00	27.
1.03	4.30	105	0.00	0.00	0.00	25.
1.03	5.00	106	0.00	0.00	0.00	24.
1.03	5.30	107	0.00	0.00	0.00	22.
1.03	6.00	108	0.00	0.00	0.00	21.
1.03	6.30	109	0.00	0.00	0.00	19.
1.03	7.00	110	0.00	0.00	0.00	18.
1.03	7.30	111	0.00	0.00	0.00	17.
1.03	8.00	112	0.00	0.00	0.00	16.
1.03	8.30	113	0.00	0.00	0.00	15.
1.03	9.00	114	0.00	0.00	0.00	14.
1.03	9.30	115	0.00	0.00	0.00	13.
1.03	10.00	116	0.00	0.00	0.00	12.
1.03	10.30	117	0.00	0.00	0.00	11.
1.03	11.00	118	0.00	0.00	0.00	10.
1.03	11.30	119	0.00	0.00	0.00	10.
1.03	12.00	120	0.00	0.00	0.00	9.
1.03	12.30	121	0.00	0.00	0.00	8.
1.03	13.00	122	0.00	0.00	0.00	8.
1.03	13.30	123	0.00	0.00	0.00	7.
1.03	14.00	124	0.00	0.00	0.00	7.
1.03	14.30	125	0.00	0.00	0.00	6.
1.03	15.00	126	0.00	0.00	0.00	6.
1.03	15.30	127	0.00	0.00	0.00	6.
1.03	16.00	128	0.00	0.00	0.00	5.
1.03	16.30	129	0.00	0.00	0.00	5.
1.03	17.00	130	0.00	0.00	0.00	4.
1.03	17.30	131	0.00	0.00	0.00	4.
1.03	18.00	132	0.00	0.00	0.00	4.
1.03	18.30	133	0.00	0.00	0.00	4.
1.03	19.00	134	0.00	0.00	0.00	3.

1.02	6.00	60	0.00	0.00	0.00	575.	1.03	19.30	135	0.00	0.00	0.00	3.
1.02	6.30	61	0.00	0.00	0.00	536.	1.03	20.00	136	0.00	0.00	0.00	3.
1.02	7.00	62	0.00	0.00	0.00	500.	1.03	20.30	137	0.00	0.00	0.00	3.
1.02	7.30	63	0.00	0.00	0.00	467.	1.03	21.00	138	0.00	0.00	0.00	3.
1.02	8.00	64	0.00	0.00	0.00	436.	1.03	21.30	139	0.00	0.00	0.00	2.
1.02	8.30	65	0.00	0.00	0.00	406.	1.03	22.00	140	0.00	0.00	0.00	2.
1.02	9.00	66	0.00	0.00	0.00	379.	1.03	22.30	141	0.00	0.00	0.00	2.
1.02	9.30	67	0.00	0.00	0.00	354.	1.03	23.00	142	0.00	0.00	0.00	2.
1.02	10.00	68	0.00	0.00	0.00	330.	1.03	23.30	143	0.00	0.00	0.00	2.
1.02	10.30	69	0.00	0.00	0.00	308.	1.04	0.00	144	0.00	0.00	0.00	2.
1.02	11.00	70	0.00	0.00	0.00	287.	1.04	0.30	145	0.00	0.00	0.00	2.
1.02	11.30	71	0.00	0.00	0.00	268.	1.04	1.00	146	0.00	0.00	0.00	1.
1.02	12.00	72	0.00	0.00	0.00	250.	1.04	1.30	147	0.00	0.00	0.00	1.
1.02	12.30	73	0.00	0.00	0.00	233.	1.04	2.00	148	0.00	0.00	0.00	1.
1.02	13.00	74	0.00	0.00	0.00	218.	1.04	2.30	149	0.00	0.00	0.00	1.
1.02	13.30	75	0.00	0.00	0.00	203.	1.04	3.00	150	0.00	0.00	0.00	1.
									SUM	25.72	22.91	2.81	163810.
										(653.)	(582.)	(71.)	(4638.58)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	13375	9300.	3275.	1137.	163806.
CMS	379.	263.	93.	32.	4638.
INCHES		16.96	23.90	24.90	24.90
MM		430.88	606.97	632.39	632.42
AC-FT		4612.	6496.	6769.	6769.
THOUS CU M		5689.	8013.	8319.	8349.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 1

2.	2.	2.	2.	1.	1.	1.	1.	1.	1.
1.	1.	4.	13.	29.	51.	74.	93.	108.	119.
128.	134.	139.	143.	164.	230.	357.	538.	750.	964.
1172.	1462.	1873.	2298.	2598.	2675.	2507.	2201.	1866.	1520.
1199.	934.	733.	580.	465.	377.	309.	264.	246.	230.
214.	200.	187.	174.	163.	152.	142.	132.	123.	115.
107.	100.	93.	87.	81.	76.	71.	66.	62.	57.
54.	50.	47.	44.	41.	38.	35.	33.	31.	29.
27.	25.	23.	22.	20.	19.	18.	17.	15.	14.
13.	13.	12.	11.	10.	9.	9.	8.	8.	7.
7.	6.	6.	5.	5.	5.	4.	4.	4.	4.
3.	3.	3.	3.	3.	2.	2.	2.	2.	2.
2.	2.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2675.	1860.	655.	227.	32761.
CMS	76.	53.	19.	6.	928.
INCHES		3.39	4.78	1.98	4.98
MM		86.18	121.39	126.48	126.48
AC-FT		922.	1299.	1314.	1354.
THOUS CU M		1138.	1603.	1670.	1670.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 2

3.	3.	3.	3.	3.	2.	2.	2.	2.	2.
2.	2.	7.	22.	51.	89.	129.	163.	189.	209.
224.	235.	244.	250.	286.	402.	624.	941.	1312.	1687.

McFARLAND-JOHNSON ENGINEERS, INC.

2050.	2559.	3278.	4022.	4547.	4681.	4388.	3852.	3265.	2660.
2098.	1634.	1282.	1016.	813.	660.	541.	462.	431.	402.
375.	350.	327.	305.	284.	265.	246.	231.	216.	201.
186.	175.	163.	152.	142.	133.	124.	116.	108.	101.
94.	88.	82.	76.	71.	66.	62.	58.	54.	50.
47.	44.	41.	38.	36.	33.	31.	29.	27.	25.
23.	22.	20.	19.	18.	17.	15.	14.	13.	13.
12.	11.	10.	10.	9.	8.	8.	7.	7.	6.
6.	5.	5.	5.	4.	4.	4.	4.	3.	3.
3.	3.	3.	2.	2.	2.	2.	2.	2.	2.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	4681.	3255.	1146.	398.	57332.
CMS	133.	92.	32.	11.	1623.
INCHES		5.94	8.36	8.71	8.71
MM		150.81	212.44	221.34	221.35
AC-FT		1614.	2274.	2369.	2369.
THOUS CU M		1991.	2805.	2922.	2922.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 3

5.	4.	4.	4.	4.	3.	3.	3.	3.	3.
2.	3.	10.	32.	73.	127.	184.	233.	270.	298.
320.	336.	348.	357.	409.	574.	891.	1345.	1875.	2410.
2929.	3656.	4682.	5746.	6495.	6688.	6269.	5503.	4665.	3801.
2997.	2335.	1832.	1451.	1162.	943.	773.	660.	616.	575.
536.	500.	467.	436.	406.	379.	354.	330.	308.	287.
268.	250.	233.	218.	203.	190.	177.	165.	154.	144.
134.	125.	117.	109.	102.	95.	88.	83.	77.	72.
67.	63.	58.	54.	51.	47.	44.	41.	38.	36.
34.	31.	29.	27.	25.	24.	22.	21.	19.	18.
17.	16.	15.	14.	13.	12.	11.	10.	10.	9.
8.	8.	7.	7.	6.	6.	6.	5.	5.	4.
4.	4.	4.	3.	3.	3.	3.	3.	2.	2.
2.	2.	2.	2.	2.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	6688.	4650.	1638.	569.	81903.
CMS	189.	132.	46.	16.	2319.
INCHES		8.48	11.95	12.45	12.45
MM		215.44	303.48	316.19	316.21
AC-FT		2306.	3248.	3384.	3384.
THOUS CU M		2844.	4007.	4174.	4175.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 4

6.	6.	5.	5.	5.	4.	4.	4.	4.	3.
3.	3.	12.	41.	94.	165.	239.	303.	351.	388.
415.	436.	452.	464.	531.	746.	1159.	1748.	2437.	3134.
3808.	4753.	6087.	7409.	8444.	8694.	8149.	7154.	6064.	4941.
3896.	3035.	2382.	1886.	1510.	1225.	1005.	858.	801.	747.
697.	650.	607.	566.	528.	493.	460.	429.	400.	374.
349.	325.	303.	283.	264.	246.	230.	215.	200.	187.
174.	163.	152.	142.	132.	123.	115.	107.	100.	93.
87.	81.	76.	71.	66.	62.	57.	54.	50.	47.
44.	41.	36.	35.	33.	31.	29.	27.	25.	23.

22.	20.	19.	18.	17.	16.	14.	13.	13.	12.
11.	10.	9.	9.	8.	8.	7.	7.	6.	6.
5.	5.	5.	4.	4.	4.	4.	3.	3.	3.
3.	3.	2.	2.	2.	2.	2.	2.	2.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	8094.	6045.	2129.	739.	106474.
CMS	240.	171.	60.	21.	3015.
INCHES		11.03	15.53	16.18	16.18
MM		280.07	394.53	411.05	411.07
AC-FT		2996.	4223.	4400.	4400.
THOUS CU M		3698.	5209.	5427.	5427.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 5

8.	7.	7.	6.	6.	5.	5.	5.	4.	4.
4.	4.	15.	51.	116.	203.	295.	373.	432.	477.
511.	537.	557.	572.	654.	918.	1426.	2151.	2999.	3857.
4687.	5849.	7492.	9193.	10393.	10700.	10030.	8804.	7463.	6081.
4795.	3735.	2931.	2321.	1859.	1508.	1230.	1056.	985.	919.
858.	800.	747.	697.	650.	607.	566.	528.	493.	460.
429.	400.	373.	348.	325.	303.	283.	264.	246.	230.
214.	200.	187.	174.	163.	152.	142.	132.	123.	115.
107.	100.	93.	87.	81.	76.	71.	66.	62.	57.
54.	50.	47.	44.	41.	38.	35.	33.	31.	29.
27.	25.	23.	22.	20.	19.	18.	17.	15.	14.
13.	13.	12.	11.	10.	9.	9.	8.	8.	7.
7.	6.	6.	5.	5.	5.	4.	4.	4.	4.
3.	3.	3.	3.	3.	2.	2.	2.	2.	2.
2.	2.	1.	1.	1.	1.	1.	1.	1.	1.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	10700.	7440.	2620.	910.	131045.
CMS	303.	211.	74.	26.	3711.
INCHES		13.57	19.12	19.92	19.92
MM		344.70	485.57	505.91	505.93
AC-FT		3689.	5197.	5415.	5415.
THOUS CU M		4551.	6411.	6679.	6679.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 6

10.	9.	8.	8.	7.	7.	6.	6.	5.	5.
5.	5.	19.	64.	145.	254.	368.	466.	540.	597.
639.	671.	690.	714.	818.	1148.	1783.	2689.	3749.	4821.
5856.	7312.	9365.	11491.	12991.	13375.	12537.	11006.	9329.	7601.
5994.	4669.	3664.	2902.	2324.	1885.	1545.	1320.	1232.	1149.
1072.	1001.	934.	871.	813.	758.	708.	660.	616.	575.
536.	500.	467.	436.	406.	379.	354.	330.	308.	287.
268.	250.	233.	218.	203.	190.	177.	165.	154.	144.
134.	125.	117.	109.	102.	95.	88.	83.	77.	72.
67.	63.	58.	54.	51.	47.	44.	41.	38.	36.
34.	31.	29.	27.	25.	24.	22.	21.	19.	18.
17.	16.	15.	14.	13.	12.	11.	10.	10.	9.
8.	8.	7.	7.	6.	6.	6.	5.	5.	4.
4.	4.	4.	3.	3.	3.	3.	3.	2.	2.
2.	2.	2.	2.	2.	1.	1.	1.	1.	1.

PEAK 6-HOUR 24-HOUR 72-[illegible] TOTAL VOLUME

CFS	13375.	9300.	3275.	1137.	163606.
CMS	379.	263.	93.	32.	4638.
INCHES		16.96	23.90	24.90	24.90
MM		430.88	606.97	632.39	632.42
AC-FT		4012.	6496.	6769.	6769.
THOUS CU M		5689.	8013.	8349.	8349.

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HYDROGRAPH ROUTING

ROUTING OF INFLOW HYDROGRAPH

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1.	0

STORAGE	0.00	170.00	290.00	390.00	930.00	1160.00	1280.00	1550.00	2710.00	3496.50
OUTFLOW	0.00	4.70	52.00	78.30	153.00	169.60	177.30	448.30	5750.00	13755.00

STATION 2, PLAN 1, RTIO 1

OUTFLOW

2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
3.	3.	3.	3.	3.	3.	4.	4.	8.	22.
39.	57.	74.	88.	101.	116.	130.	142.	153.	158.
161.	164.	166.	167.	168.	169.	170.	170.	170.	170.
171.	171.	171.	171.	171.	171.	171.	171.	170.	170.
170.	170.	170.	170.	169.	169.	169.	168.	168.	168.
167.	167.	167.	166.	166.	166.	165.	165.	164.	164.
164.	163.	163.	162.	162.	162.	161.	161.	160.	160.
159.	159.	159.	158.	158.	157.	157.	157.	156.	155.
155.	155.	154.	154.	153.	153.	152.	151.	150.	149.
148.	148.	147.	146.	145.	144.	144.	143.	142.	141.
140.	140.	139.	138.	137.	136.	136.	135.	134.	133.
133.	132.	131.	130.	130.	129.	128.	127.	127.	126.
125.	125.	124.	123.	122.	122.	121.	120.	120.	119.

STOR

69.	69.	69.	69.	69.	69.	69.	69.	69.	69.
69.	69.	69.	69.	70.	71.	74.	77.	81.	86.
91.	96.	102.	107.	114.	122.	133.	152.	178.	213.
256.	308.	374.	457.	555.	659.	761.	853.	931.	994.
1044.	1081.	1109.	1129.	1144.	1154.	1161.	1166.	1170.	1172.
1175.	1176.	1177.	1177.	1177.	1177.	1176.	1174.	1173.	1170.
1168.	1165.	1162.	1159.	1155.	1152.	1148.	1144.	1139.	1135.
1130.	1125.	1121.	1116.	1110.	1105.	1100.	1094.	1089.	1083.
1078.	1072.	1066.	1061.	1055.	1049.	1043.	1037.	1031.	1025.
1019.	1013.	1007.	1001.	995.	989.	982.	976.	970.	964.
958.	952.	946.	940.	933.	927.	921.	915.	909.	903.

McFARLAND - JOHNSON ENGINEERS, INC

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   897.      891.      885.      879.      873.      867.      862.      856.      850.      844.
   838.      833.      827.      821.      816.      810.      805.      799.      794.      788.
   783.      777.      772.      766.      761.      756.      750.      745.      740.      735.
   730.      724.      719.      714.      709.      704.      699.      694.      689.      684.

                                        STAGE
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0

                          PEAK    6-HOUR    24-HOUR    72-HOUR   TOTAL VOLUME
                 CFS      171.      171.       167.       124.         17668.
                 CMS        5.        5.         5.         4.           506.
              INCHES                0.31       1.22       2.71           2.72
                  MM                7.90      30.99      68.95          68.99
               AC-FT                 85.       332.       738.           738.
          THOUS CU M                104.       409.       910.           911.


                          MAXIMUM STORAGE =      1177.


                          STATION        2, PLAN 1, RTIO 2

                                       OUTFLOW
     3.        3.        3.        3.        3.        3.        3.        3.        3.        3.
     3.        3.        3.        3.        3.        3.        4.        4.        4.        4.
     4.        5.        8.       12.       16.       21.       29.       41.       56.       72.
    85.       98.      114.      134.      156.      169.      225.      384.      722.     1109.
  1328.     1421.     1427.     1379.     1299.     1202.     1098.      995.      901.      817.
   743.      677.      619.      567.      520.      477.      446.      438.      429.      420.
   411.      402.      392.      383.      373.      364.      354.      344.      335.      326.
   316.      307.      298.      289.      280.      272.      263.      255.      247.      239.
   231.      224.      216.      209.      202.      195.      189.      182.      177.      177.
   176.      176.      176.      175.      175.      174.      174.      174.      173.      173.
   172.      172.      171.      171.      171.      170.      170.      169.      169.      168.
   168.      167.      167.      166.      166.      165.      165.      164.      164.      163.
   163.      162.      162.      162.      161.      161.      160.      160.      159.      159.
   158.      158.      157.      157.      156.      156.      155.      155.      155.      154.
   154.      153.      152.      152.      151.      150.      149.      148.      147.      146.

                                        STOR
   120.      120.      120.      120.      120.      120.      120.      120.      120.      120.
   120.      120.      120.      121.      122.      125.      129.      135.      142.      150.
   159.      168.      178.      188.      198.      212.      232.      263.      307.      366.
   440.      532.      648.      794.      965.     1149.     1328.     1486.     1610.     1694.
  1742.     1763.     1764.     1754.     1736.     1715.     1692.     1670.     1649.     1631.
  1615.     1600.     1587.     1576.     1566.     1556.     1548.     1540.     1531.     1522.
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 1513.     1503.     1494.     1485.     1475.     1466.     1456.     1447.     1437.     1428.
 1419.     1409.     1400.     1391.     1383.     1374.     1366.     1358.     1349.     1342.
 1334.     1326.     1319.     1312.     1305.     1298.     1291.     1285.     1279.     1272.
 1266.     1260.     1253.     1247.     1241.     1234.     1228.     1221.     1214.     1208.
 1201.     1195.     1188.     1181.     1175.     1168.     1161.     1154.     1148.     1141.
 1134.     1128.     1121.     1114.     1108.     1101.     1094.     1088.     1081.     1074.
 1068.     1061.     1055.     1048.     1041.     1035.     1028.     1022.     1015.     1009.
 1002.      996.      989.      983.      977.      970.      964.      957.      951.      945.
  938.      932.      926.      919.      913.      907.      901.      895.      889.      883.

                                        STAGE
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0

                          PEAK    6-HOUR   24-HOUR   72-HOUR   TOTAL VOLUME
                   CFS   1427.     1142.      562.      270.        38867.
                   CMS     40.       32.       16.        8.         1101.
                INCHES              2.06      4.10      5.91          5.91
                    MM             52.92    104.10    150.07        150.13
                 AC-FT              566.     1114.     1606.         1607.
            THOUS CU M              699.     1374.     1981.         1982.


                             MAXIMUM STORAGE =      1764.


                             STATION       2, PLAN 1, RTIO 3

                                       OUTFLOW
    5.        5.        5.        5.        5.        5.        5.        5.        5.        5.
    5.        5.        5.        5.        6.        7.        9.       13.       17.       21.
   26.       30.       35.       41.       46.       53.       60.       72.       84.       95.
  110.      128.      151.      167.      267.      770.     1755.     2468.     2919.     3146.
 3189.     3099.     2924.     2703.     2462.     2218.     1984.     1765.     1570.     1402.
 1256.     1129.     1017.      920.      834.      758.      690.      630.      576.      528.
  465.      448.      439.      431.      422.      413.      403.      394.      384.      375.
  365.      356.      346.      337.      327.      318.      309.      300.      291.      282.
  273.      265.      256.      248.      240.      233.      225.      218.      210.      203.
  197.      190.      183.      177.      177.      176.      176.      176.      175.      175.
  174.      174.      174.      173.      173.      172.      172.      171.      171.      171.
  170.      170.      169.      169.      168.      168.      167.      167.      166.      166.
  165.      165.      164.      164.      164.      163.      163.      162.      162.      161.
  161.      160.      160.      159.      159.      158.      158.      157.      157.      156.
  156.      156.      155.      155.      154.      154.      153.      153.      152.      151.

                                         STOR
  170.      170.      170.      170.      170.      170.      170.      170.      170.      170.
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   170.      170.      170.      170.      172.      176.      182.      190.      200.      211.
   223.      235.      246.      261.      275.      293.      321.      365.      428.      513.
   619.      750.      917.     1125.     1369.     1620.     1836.     1992.     2091.     2140.
  2150.     2130.     2092.     2043.     1991.     1937.     1866.     1838.     1796.     1759.
  1727.     1699.     1675.     1653.     1634.     1618.     1603.     1590.     1578.     1567.
  1558.     1549.     1541.     1532.     1524.     1514.     1505.     1496.     1486.     1477.
  1467.     1458.     1448.     1439.     1429.     1420.     1411.     1402.     1393.     1384.
  1376.     1367.     1359.     1351.     1343.     1335.     1328.     1320.     1313.     1306.
  1299.     1292.     1286.     1260.     1274.     1267.     1261.     1255.     1248.     1242.
  1235.     1229.     1222.     1215.     1209.     1202.     1196.     1189.     1182.     1176.
  1169.     1162.     1156.     1149.     1142.     1135.     1129.     1122.     1115.     1109.
  1102.     1095.     1089.     1082.     1075.     1069.     1062.     1056.     1049.     1043.
  1036.     1029.     1023.     1016.     1010.     1003.      997.      990.      984.      978.
   971.      965.      958.      952.      946.      939.      933.      927.      920.      914.

                                       STAGE
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0

                            PEAK    6-HOUR    24-HOUR    72-HOUR   TOTAL VOLUME
                   CFS     3169.     2545.      1061.       444.         63895.
                   CMS       90.       72.        30.        13.          1809.
                INCHES               4.64       7.74       9.71           9.71
                    MM             117.90     196.64     246.59         246.68
                 AC-FT              1262.      2105.      2639.          2640.
            THOUS CU M              1557.      2596.      3256.          3257.


                              MAXIMUM STORAGE =      2150.


                              STATION       2, PLAN 1, RTIO 4

                                      OUTFLOW
     6.        6.        6.        6.        6.        6.        6.        6.        6.        6.
     6.        6.        6.        6.        7.        9.       12.       17.       22.       27.
    33.       40.       46.       53.       57.       64.       73.       83.       95.      110.
   129.      153.      169.      316.     1204.     2475.     3501.     4217.     4630.     4781.
  4718.     4502.     4192.     3837.     3468.     3106.     2762.     2446.     2167.     1927.
  1719.     1539.     1382.     1244.     1124.     1018.      925.      842.      768.      702.
   643.      591.      543.      500.      461.      443.      435.      426.      417.      408.
   399.      369.      360.      370.      361.      351.      342.      333.      323.      314.
   305.      296.      287.      279.      270.      262.      253.      245.      238.      230.
   222.      215.      208.      201.      194.      186.      181.      177.      177.      176.
   176.      176.      175.      175.      174.      174.      173.      173.      173.      172.
   172.      171.      171.      170.      170.      170.      169.      169.      168.      168.
   167.      167.      166.      166.      165.      165.      164.      164.      163.      163.
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  162.      162.      161.      161.      160.      160.      160.      159.      159.      158.
  158.      157.      157.      156.      156.      155.      155.      154.      154.      154.

                                          STOR
  174.      174.      174.      174.      174.      174.      174.      173.      173.      173.
  173.      173.      173.      174.      176.      181.      189.      200.      213.      227.
  242.      258.      275.      292.      310.      334.      371.      427.      510.      621.
  760.      931.     1148.     1418.     1715.     1993.     2218.     2375.     2465.     2498.
 2464.     2437.     2369.     2291.     2211.     2131.     2056.     1987.     1926.     1873.
 1828.     1769.     1754.     1724.     1698.     1675.     1654.     1636.     1620.     1606.
 1593.     1581.     1571.     1561.     1553.     1545.     1536.     1528.     1519.     1510.
 1501.     1491.     1482.     1472.     1463.     1454.     1444.     1435.     1426.     1416.
 1407.     1398.     1390.     1381.     1372.     1364.     1356.     1348.     1340.     1332.
 1325.     1318.     1310.     1304.     1297.     1290.     1284.     1278.     1271.     1265.
 1259.     1252.     1246.     1239.     1233.     1226.     1220.     1213.     1207.     1200.
 1193.     1187.     1180.     1173.     1167.     1160.     1153.     1147.     1140.     1133.
 1127.     1120.     1113.     1107.     1100.     1093.     1087.     1080.     1073.     1067.
 1060.     1053.     1047.     1040.     1034.     1027.     1021.     1014.     1008.     1001.
  995.      988.      982.      975.      969.      963.      956.      950.      944.      937.

                                          STAGE
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0

                         PEAK    6-HOUR    24-HOUR    72-HOUR    TOTAL VOLUME
               CFS      4761.     3846.      1547.       611.          87997.
               CMS       135.      109.        44.        17.           2492.
            INCHES                 7.02      11.28      13.37           13.38
                MM               178.27     286.61     339.62          339.74
             AC-FT                1908.      3068.      3635.           3636.
        THOUS CU M                2354.      3784.      4484.           4485.


                         MAXIMUM STORAGE =     2498.


                         STATION       2, PLAN 1, RTIO 5

                                          OUTFLOW
    8.        8.        8.        8.        8.        8.        7.        7.        7.        7.
    7.        7.        7.        6.        9.       11.       15.       20.       27.       33.
   41.       49.       55.       61.       67.       74.       83.       92.      106.      125.
  149.      166.      276.     1109.     2606.     3978.     5080.     5908.     6681.     6713.
 6270.     5662.     5260.     4606.     4337.     3879.     3447.     3050.     2700.     2398.
 2138.     1912.     1715.     1544.     1394.     1262.     1145.     1042.      950.      868.
  795.      730.      670.      617.      569.      525.      485.      448.      440.      432.
  424.      415.      406.      397.      387.      378.      369.      359.      350.      340.
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  331.      322.      313.      304.      295.      286.      277.      269.      261.      252.
  244.      237.      229.      221.      214.      207.      200.      193.      187.      180.
  177.      177.      176.      176.      175.      175.      175.      174.      174.      173.
  173.      173.      172.      172.      171.      171.      170.      170.      170.      169.
  169.      168.      168.      167.      167.      166.      166.      165.      165.      164.
  164.      163.      163.      162.      162.      161.      161.      160.      160.      160.
  159.      159.      158.      158.      157.      157.      156.      156.      155.      155.

                                          STOR
  177.      177.      177.      177.      177.      177.      177.      177.      177.      177.
  177.      176.      177.      178.      181.      187.      197.      210.      225.      243.
  262.      282.      302.      323.      346.      375.      420.      491.      593.      730.
  901.     1112.     1378.     1695.     2022.     2322.     2563.     2725.     2801.     2805.
 2761.     2691.     2603.     2503.     2401.     2301.     2206.     2119.     2043.     1977.
 1920.     1870.     1827.     1790.     1757.     1728.     1702.     1680.     1660.     1642.
 1626.     1612.     1599.     1587.     1576.     1567.     1558.     1550.     1542.     1534.
 1525.     1517.     1508.     1499.     1489.     1480.     1471.     1461.     1452.     1443.
 1433.     1424.     1415.     1406.     1397.     1388.     1380.     1371.     1363.     1355.
 1347.     1339.     1331.     1324.     1317.     1310.     1303.     1296.     1289.     1283.
 1277.     1271.     1264.     1258.     1252.     1245.     1239.     1232.     1226.     1219.
 1213.     1206.     1199.     1193.     1186.     1179.     1173.     1166.     1159.     1153.
 1146.     1139.     1133.     1126.     1119.     1113.     1106.     1099.     1093.     1086.
 1079.     1073.     1066.     1059.     1053.     1046.     1040.     1033.     1027.     1020.
 1014.     1007.     1001.      994.      988.      981.      975.      968.      962.      956.

                                          STAGE
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
  0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0

                          PEAK     6-HOUR    24-HOUR    72-HOUR    TOTAL VOLUME
                 CFS     6713.     5133.     2035.       779.        112210.
                 CMS      190.      145.       58.        22.          3177.
              INCHES                9.36     14.65      17.05         17.06
                  MM              237.83    377.17     433.07        433.22
               AC-FT               2545.     4037.      4635.         4637.
         THOUS CU M                3140.     4980.      5717.         5719.


                        MAXIMUM STORAGE =      2805.


                        STATION      2, PLAN 1, RTIO 6

                                          OUT   W
   10.       10.        9.        9.        9.        9.        9.        9.        9.        9.
    9.        9.        9.       10.       11.       14.       19.       25.       33.       42.
   51.       58.       65.       72.       79.       84.       92.      104.      122.      145.
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  165.      251.     1005.     2031.     4290.     5900.     8352.     9540.     9758.     9309.
 8436.     7357.     6249.     5486.     4990.     4492.     4013.     3568.     3172.     2830.
 2534.     2275.     2049.     1852.     1677.     1523.     1367.     1266.     1157.     1060.
  973.      895.      824.      759.      701.      648.      599.      555.      514.      477.
  447.      439.      431.      423.      414.      405.      396.      387.      378.      369.
  359.      350.      341.      331.      322.      313.      304.      295.      286.      278.
  269.      261.      253.      245.      237.      229.      222.      215.      208.      201.
  194.      187.      181.      177.      177.      176.      176.      176.      175.      175.
  174.      174.      173.      173.      173.      172.      172.      171.      171.      170.
  170.      170.      169.      169.      168.      168.      167.      167.      166.      166.
  165.      165.      164.      164.      163.      163.      162.      162.      161.      161.
  160.      160.      160.      159.      159.      158.      158.      157.      157.      156.

                                          STOR
  182.      182.      182.      182.      182.      182.      182.      182.      182.      181.
  181.      181.      181.      182.      186.      194.      206.      223.      242.      264.
  288.      313.      338.      365.      393.      430.      487.      576.      704.      876.
 1090.     1353.     1672.     2028.     2391.     2725.     2966.     3082.     3104.     3060.
 2974.     2868.     2759.     2652.     2544.     2435.     2330.     2233.     2146.     2071.
 2006.     1950.     1900.     1857.     1819.     1785.     1755.     1729.     1705.     1684.
 1665.     1648.     1632.     1618.     1605.     1594.     1583.     1573.     1564.     1556.
 1549.     1541.     1533.     1525.     1516.     1507.     1498.     1489.     1480.     1471.
 1461.     1452.     1443.     1434.     1424.     1415.     1406.     1398.     1389.     1380.
 1372.     1363.     1355.     1347.     1340.     1332.     1325.     1317.     1310.     1303.
 1297.     1290.     1284.     1277.     1271.     1265.     1259.     1252.     1246.     1239.
 1233.     1226.     1220.     1213.     1207.     1200.     1193.     1187.     1180.     1173.
 1167.     1160.     1153.     1147.     1140.     1133.     1127.     1120.     1113.     1107.
 1100.     1093.     1087.     1080.     1073.     1067.     1060.     1054.     1047.     1040.
 1034.     1027.     1021.     1014.     1008.     1001.      995.      988.      982.      976.

                                          STAGE
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
   0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0

                          PEAK    6-HOUR    24-HOUR    72-HOUR    TOTAL VOLUME
                 CFS      9758.    7002.      2690.      1004.        144607.
                 CMS       276.     198.        76.        28.          4095.
              INCHES               12.77      19.63      21.97          21.98
                  MM              324.39     498.57     558.11         558.29
               AC-FT               3472.      5336.      5974.          5975.
          THOUS CU M               4283.      6582.      7368.          7371.

                        MAXIMUM STORAGE =       3104.
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PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PERIOD/RATIO RUNOFF COMPUTATIONS
INPUT IN CUBIC FEET PER SECOND (CUBIC METER PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PEAK	RATIO 1 0.20	RATIO 2 0.35	RATIO 3 0.50	RATIO 4 0.65	RATIO 5 0.80	RATIO 6 1.00
HYDROGRAPH AT	1	5.10	1	2073.	4001.	5999.	8894.	10700.	13375.
	(	13.21)	(	58.73)(	113.30)(	169.87)(	251.86)(	302.99)(	378.74)(
ROUTED TO	2	5.10	1	171.	1427.	3169.	4761.	6713.	9759.
	(	13.21)	(	4.85)(	40.42)(	89.72)(	134.87)(	190.09)(	276.32)(

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**********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JUNE 1978
  LAST MODIFICATION  20 DEC 79
**********************************
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McGuire-Johnson Engineers, P.C.
171 Front Street
BINGHAMTON, NEW YORK 13905

SHEET NO. _____ OF _____
CALCULATED BY _____ DATE 7/16/80
CHECKED BY _____ DATE _____
SCALE _____

Computations based on Fill Stage
Removed to Invert of Box - 1415.35

Stage - Discharge Computation

Normal Pool Elevation - 1415.35
Elevation Top of Spillway - 1415.35
Elevation Top of Dam - 1424.0
Elevation of Tailwater - 1412.1

Size of Outlet Box - 5.4' (width) X 6.9' (Height)
Length of Box - 81'
Elev. @ Inlet of Box - 1415.35

Assumptions:

① Discharge thru the box was derived from the Bureau of Rec's Froads Hydraulic Engineering Circular #5

② Normal Pool Elevation was assumed to be 1415.35, the stage discharge data was computed from this elevation

③ In computing flow over the top of the dam the broad crested weir formula was used, $Q = CLH^{3/2}$ and the weir coefficient 'C' was 3.0

McFarland-Johnson Engineers, Inc.
171 Front Street
BINGHAMTON, NEW YORK 13905

CALCULATED BY _____ DATE _____
CHECKED BY _____ DATE _____
SCALE _____

	ft	sq ft		ft.	ft	ft	ft	ft	cfs	ft	ft	ft	cm
418.85	0	0	–	–	–	–	–	–	–	–	–	–	0
1417.85	2	30.4	.37	2	1.7	.55	0	2	–	–	–	–	50.1
419.85	4	140	.55	4	3.33	.9	0.33	4	–	–	–	–	90
421.85	6	350	.87	6	5.0	1.2	0.35	6	–	–	–	–	150
422.85	7	360	.91	7	5.75	1.4	3.2	7	–	–		–	3 [illegible]
423.85	8	364	1.16	8	6.33	2.1	4.7	8	–	–		–	3 [illegible]
424.2	8.65	390	1.25	8.65	7.1	2.1	5.25	8.5	–	–	–	–	3 [illegible]
425.1	10	474	1.45	10	7.9	3.3	7.3	10	–	1.[illegible]	10	–	3 [illegible]
426.1	11	514	1.53	11	8.5	3.9	8.25	11	–	2.35	2.[illegible]	2.1	2760
427.85	12	549	1.74	12	9.5	4.9	9.9	12	–	3.85	350	43[illegible]	3165
428.[illegible]	13	571	1.84	13	10.2	5.	11.25	13	–	4.[illegible]	3[illegible]	[illegible]	70[illegible]

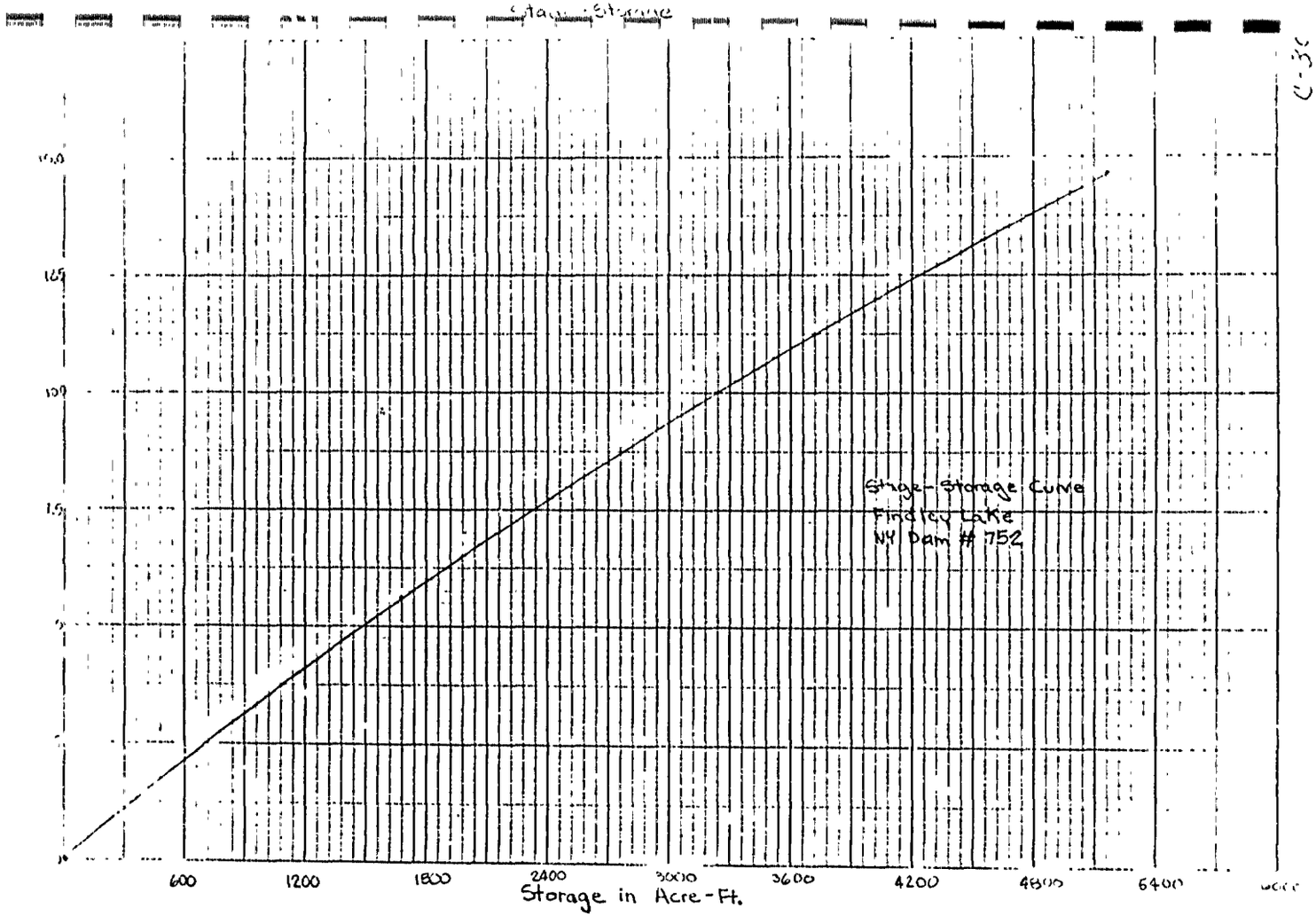
McFarland-Johnson Engineers, Inc.
171 Front Street
BINGHAMTON, NEW YORK 13905

SHEET N
CALCULATED BY [illegible] DATE [illegible]
CHECKED BY ________ DATE
SCALE ________

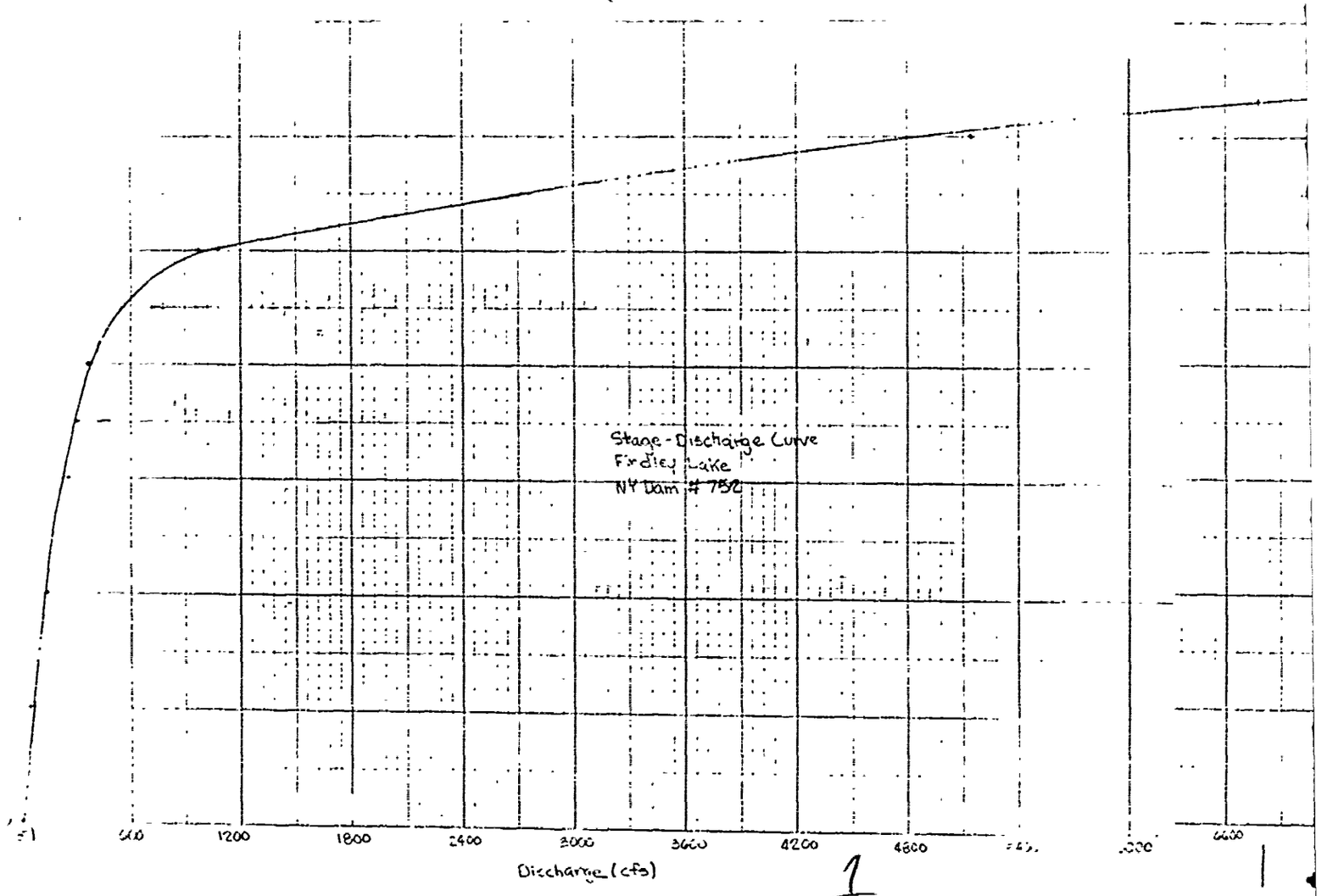
Storage Calculation

Elevation (ft.)	Surface Area (Acres)	Avg. Area (Acres)	Incremental Stor. (Acre-ft.)	Total Storage (Acre-ft.)	Remarks
1415.35	257	–	–	0	Surface area was [illegible] from the USGS quadrangle for Clymer, [illegible]. The surface area at 1415.35 [illegible] incremental storage for vertical feet from elevation 1421 to 1430 [illegible] 1415.35
1421.0	330	293.5	1658	1658	
1430.0	447	388.5	3497	5,155	

PRODUCT 204-1 [illegible] Inc., Groton, Mass. 01450

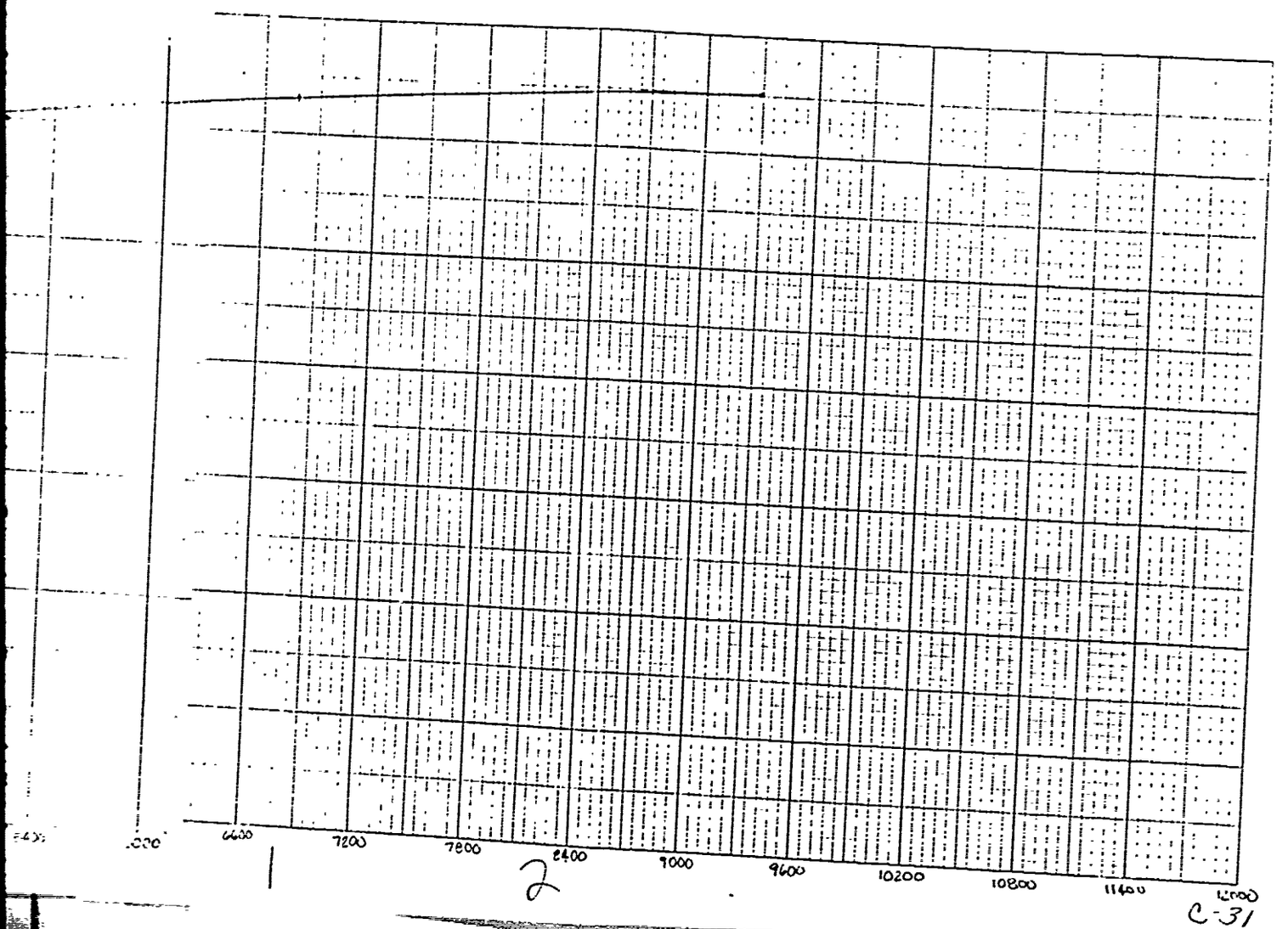

Stage-Storage
C-32
Stage-Storage Curve
Findley Lake
NY Dam # 752
600
1200
1800
2400
3000
3600
4200
4800
5400
Storage in Acre-Ft.

46 0702


Stage - Discharge Curve
Findley Lake
NY Dam # 752
1200
1800
2400
3000
3600
4200
4800
6000
6600
Discharge (cfs)

1

46 0782



C-31

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**********************************
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  29 FEB 79
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1		H1			ANALYSIS OF DAM OVERTOPPING USING RATIOS OF PMF						
2		H2			HYDROLOGIC/HYDRAULIC ANALYSIS OF SAFETY OF NY 752						
3		H3			RATIOS OF PMF ROUTED THROUGH THE RESERVOIR						
4		D	150	1	30	0	0	0	0	0	0	0
5		D1	5									
6		D	1	0	1							
7		D1	.2	.35	.50	.65	.80	1				
8		*	1	1	0	0	0	0	1			
9		H1		CALCULATION OF INFLOW HYDROGRAPH								
10		*	1	1	5.1	0	5.1	0	0	0	0	0
11		K	0	44.5	111c	127	141	0	0	0	0	0
12		I	0	0	0	0	0	0	1	.1	0	0
13		*	4.0c	.05								
14		X	-2	-.1	2							
15		K	1	2	0	0	0	0	1	0	0	0
16		H1		ROUTING OF INFLOW HYDROGRAPH								
17		I	0	0	0	1	1					
18		H1	1	0	0	0	0	0	-1			
19		H2	0	550	1170	1820	2160	2500	2730	3240	3630	4040
20		H2	4440									
21	fill Shoulder	H3	0	50	140	252	308	364	392	972	2720	5148
22	Removed	H3	9201									
23		K	99									

[illegible] OF SEQUENCE OF STEAM NETWORK CALCULATIONS

[illegible]	1
[illegible]	2
END OF NETWORK	

****
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION JULY 1978
LAST MODIFICATION 28 FEB 79
****

TIME OF EXECUTION: 24-JUL-80 08:49:31

ANALYSIS OF DAM OVERTOPPING USING RATIOS OF PMF
HYDROLOGIC-HYDRAULIC ANALYSIS OF SAFETY OF NY 752
RATIOS OF PMF ROUTED THROUGH THE RESERVOIR

JOB SPECIFICATION

NW	NMIN	MTIM	IDAY	IHR	IMIN	METRIC	IPLT	IPRT	NSTAN
150	0	30	0	0	0	0	0	0	0

ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
5	0	0	0		

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 5 LRTIO= 1
RTIOS= 0.20 0.35 0.50 0.65 0.80 1.00

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

CALCULATION OF INFLOW HYDROGRAPH

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUNG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	5.10	0.00	5.10	0.00	0.000	0	0	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.50	116.00	127.00	141.00	0.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM AS 0.000

LOSS DATA

LROPT	STRTL	CNSTL	RTIOL	ERAIN	STRKS	RTIOK	STRIL	CNSTL	ALSMA	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.10	0.00	0.00

UNIT HYDROGRAPH DATA
TP= 2.09 CP=0.63 NTA= 0

RECESSION DATA
STRTQ= -2.00 QRCSN= -0.10 RTIOR= 2.00
APPROXIMATE CLARK COEFFICIENTS FOR GIVEN STORAGE CP AND TP ARE TC= 5.02 AND R= 3.64 INTERVALS

UNIT HYDROGRAPH 22 END-OF-PERIOD ORDINATES, LAG= 2.09 HOURS, CP= 0.64 VOL= 1.00

1060.	809.	646.	965.	956.	852.	640.	490.	372.	282.
214.	162.	123.	93.	71.	54.	41.	31.	23.	18.
13.	10.								

PMS-IN-PERIOD FLOW

DAY	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	0.30	1	0.09	0.00	0.09	10.
1.01	1.00	2	0.09	0.00	0.09	9.
1.01	1.30	3	0.09	0.00	0.09	8.
1.01	2.00	4	0.09	0.00	0.09	8.
1.01	2.30	5	0.09	0.00	0.09	7.
1.01	3.00	6	0.09	0.00	0.09	7.
1.01	3.30	7	0.09	0.00	0.09	6.
1.01	4.00	8	0.09	0.00	0.09	6.
1.01	4.30	9	0.09	0.00	0.09	5.
1.01	5.00	10	0.09	0.00	0.09	5.
1.01	5.30	11	0.09	0.00	0.09	5.
1.01	6.00	12	0.09	0.01	0.08	5.
1.01	6.30	13	0.17	0.12	0.05	19.
1.01	7.00	14	0.17	0.12	0.05	64.
1.01	7.30	15	0.17	0.12	0.05	145.
1.01	8.00	16	0.17	0.12	0.05	254.
1.01	8.30	17	0.17	0.12	0.05	389.
1.01	9.00	18	0.17	0.12	0.05	485.
1.01	9.30	19	0.17	0.12	0.05	540.
1.01	10.00	20	0.17	0.12	0.05	597.
1.01	10.30	21	0.17	0.12	0.05	639.
1.01	11.00	22	0.17	0.12	0.05	671.
1.01	11.30	23	0.17	0.12	0.05	696.
1.01	12.00	24	0.17	0.12	0.05	714.
1.01	12.30	25	1.06	1.01	0.05	816.
1.01	13.00	26	1.06	1.01	0.05	1148.
1.01	13.30	27	1.27	1.22	0.05	1783.
1.01	14.00	28	1.27	1.22	0.05	2689.
1.01	14.30	29	1.59	1.54	0.05	3749.
1.01	15.00	30	1.59	1.54	0.05	4821.
1.01	15.30	31	1.93	1.88	0.05	5858.
1.01	16.00	32	0.11	0.06	0.05	7312.
1.01	16.30	33	1.48	1.43	0.05	9305.
1.01	17.00	34	1.48	1.43	0.05	11491.
1.01	17.30	35	1.16	1.11	0.05	12991.
1.01	18.00	36	1.16	1.11	0.05	13375.
1.01	18.30	37	0.13	0.08	0.05	12537.
1.01	19.00	38	0.13	0.08	0.05	11006.
1.01	19.30	39	0.13	0.08	0.05	9329.
1.01	20.00	40	0.13	0.08	0.05	7601.
1.01	20.30	41	0.13	0.08	0.05	5994.
1.01	21.00	42	0.13	0.08	0.05	4869.
1.01	21.30	43	0.13	0.08	0.05	3864.
1.01	22.00	44	0.13	0.08	0.05	2902.
1.01	22.30	45	0.13	0.08	0.05	2324.
1.01	23.00	46	0.13	0.08	0.05	1885.
1.01	23.30	47	0.13	0.08	0.05	1545.
1.02	0.00	48	0.13	0.08	0.05	1320.
1.02	0.30	49	0.00	0.00	0.00	1232.
1.02	1.00	50	0.00	0.00	0.00	1149.
1.02	1.30	51	0.00	0.00	0.00	1072.
1.02	2.00	52	0.00	0.00	0.00	1001.
1.02	2.30	53	0.00	0.00	0.00	934.
1.02	3.00	54	0.00	0.00	0.00	871.
1.02	3.30	55	0.00	0.00	0.00	813.
1.02	4.00	56	0.00	0.00	0.00	758.
1.02	4.30	57	0.00	0.00	0.00	708.
1.02	5.00	58	0.00	0.00	0.00	660.

DAY	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.02	14.00	76	0.00	0.00	0.00	190.
1.02	14.30	77	0.00	0.00	0.00	177.
1.02	15.00	78	0.00	0.00	0.00	165.
1.02	15.30	79	0.00	0.00	0.00	154.
1.02	16.00	80	0.00	0.00	0.00	144.
1.02	16.30	81	0.00	0.00	0.00	134.
1.02	17.00	82	0.00	0.00	0.00	125.
1.02	17.30	83	0.00	0.00	0.00	117.
1.02	18.00	84	0.00	0.00	0.00	109.
1.02	18.30	85	0.00	0.00	0.00	102.
1.02	19.00	86	0.00	0.00	0.00	95.
1.02	19.30	87	0.00	0.00	0.00	88.
1.02	20.00	88	0.00	0.00	0.00	83.
1.02	20.30	89	0.00	0.00	0.00	77.
1.02	21.00	90	0.00	0.00	0.00	72.
1.02	21.30	91	0.00	0.00	0.00	67.
1.02	22.00	92	0.00	0.00	0.00	63.
1.02	22.30	93	0.00	0.00	0.00	58.
1.02	23.00	94	0.00	0.00	0.00	54.
1.02	23.30	95	0.00	0.00	0.00	51.
1.03	0.00	96	0.00	0.00	0.00	47.
1.03	0.30	97	0.00	0.00	0.00	44.
1.03	1.00	98	0.00	0.00	0.00	41.
1.03	1.30	99	0.00	0.00	0.00	38.
1.03	2.00	100	0.00	0.00	0.00	36.
1.03	2.30	101	0.00	0.00	0.00	34.
1.03	3.00	102	0.00	0.00	0.00	31.
1.03	3.30	103	0.00	0.00	0.00	29.
1.03	4.00	104	0.00	0.00	0.00	27.
1.03	4.30	105	0.00	0.00	0.00	25.
1.03	5.00	106	0.00	0.00	0.00	24.
1.03	5.30	107	0.00	0.00	0.00	22.
1.03	6.00	108	0.00	0.00	0.00	21.
1.03	6.30	109	0.00	0.00	0.00	19.
1.03	7.00	110	0.00	0.00	0.00	18.
1.03	7.30	111	0.00	0.00	0.00	17.
1.03	8.00	112	0.00	0.00	0.00	16.
1.03	8.30	113	0.00	0.00	0.00	15.
1.03	9.00	114	0.00	0.00	0.00	14.
1.03	9.30	115	0.00	0.00	0.00	13.
1.03	10.00	116	0.00	0.00	0.00	12.
1.03	10.30	117	0.00	0.00	0.00	11.
1.03	11.00	118	0.00	0.00	0.00	10.
1.03	11.30	119	0.00	0.00	0.00	10.
1.03	12.00	120	0.00	0.00	0.00	9.
1.03	12.30	121	0.00	0.00	0.00	8.
1.03	13.00	122	0.00	0.00	0.00	8.
1.03	13.30	123	0.00	0.00	0.00	7.
1.03	14.00	124	0.00	0.00	0.00	7.
1.03	14.30	125	0.00	0.00	0.00	6.
1.03	15.00	126	0.00	0.00	0.00	6.
1.03	15.30	127	0.00	0.00	0.00	6.
1.03	16.00	128	0.00	0.00	0.00	5.
1.03	16.30	129	0.00	0.00	0.00	5.
1.03	17.00	130	0.00	0.00	0.00	4.
1.03	17.30	131	0.00	0.00	0.00	4.
1.03	18.00	132	0.00	0.00	0.00	4.
1.03	18.30	133	0.00	0.00	0.00	4.

1.02	6.30	60	0.00	0.00	0.00	575.	1.03	19.30	135	0.00	0.00	0.00	3.
1.02	6.30	61	0.00	0.00	0.00	538.	1.03	20.00	136	0.00	0.00	0.00	3.
1.02	7.00	62	0.00	0.00	0.00	500.	1.03	20.30	137	0.00	0.00	0.00	3.
1.02	7.30	63	0.00	0.00	0.00	467.	1.03	21.00	138	0.00	0.00	0.00	3.
1.02	8.00	64	0.00	0.00	0.00	438.	1.03	21.30	139	0.00	0.00	0.00	2.
1.02	8.30	65	0.00	0.00	0.00	408.	1.03	22.00	140	0.00	0.00	0.00	2.
1.02	9.00	66	0.00	0.00	0.00	379.	1.03	22.30	141	0.00	0.00	0.00	2.
1.02	9.30	67	0.00	0.00	0.00	354.	1.03	23.00	142	0.00	0.00	0.00	2.
1.02	10.00	68	0.00	0.00	0.00	330.	1.03	23.30	143	0.00	0.00	0.00	2.
1.02	10.30	69	0.00	0.00	0.00	306.	1.04	0.00	144	0.00	0.00	0.00	2.
1.02	11.00	70	0.00	0.00	0.00	287.	1.04	0.30	145	0.00	0.00	0.00	2.
1.02	11.30	71	0.00	0.00	0.00	268.	1.04	1.00	146	0.00	0.00	0.00	1.
1.02	12.00	72	0.00	0.00	0.00	250.	1.04	1.30	147	0.00	0.00	0.00	1.
1.02	12.30	73	0.00	0.00	0.00	233.	1.04	2.00	148	0.00	0.00	0.00	1.
1.02	13.00	74	0.00	0.00	0.00	218.	1.04	2.30	149	0.00	0.00	0.00	1.
1.02	13.30	75	0.00	0.00	0.00	203.	1.04	3.00	150	0.00	0.00	0.00	1.
									SUM	25.72	22.91	2.81	163810.
										(653.)(582.)(71.)(4636.58)			

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	13375.	9300.	3275.	1137.	103800.
CMS	379.	263.	93.	32.	4638.
INCHES		18.90	23.90	24.90	24.90
MM		480.88	606.97	632.39	632.42
HECTARES		4812.	6496.	6769.	6769.
THOUS CU M		5889.	8013.	8349.	8349.

HYDROGRAPH AT STA 1 FOR PLAN 1, RIIC 1

2.	2.	2.	2.	1.	1.	1.	1.	1.	1.
1.	1.	1.	14.	29.	51.	74.	93.	108.	119.
126.	134.	139.	143.	164.	230.	357.	538.	750.	954.
1172.	1402.	1673.	2290.	2598.	2675.	2507.	2201.	1866.	1520.
1199.	934.	733.	580.	465.	377.	309.	264.	246.	230.
214.	200.	187.	174.	163.	152.	142.	132.	123.	115.
107.	100.	93.	87.	81.	76.	71.	66.	62.	57.
54.	50.	47.	44.	41.	38.	35.	33.	31.	29.
27.	25.	23.	22.	20.	19.	18.	17.	15.	14.
13.	13.	12.	11.	10.	9.	9.	8.	8.	7.
7.	6.	6.	5.	5.	5.	4.	4.	4.	4.
3.	3.	3.	3.	3.	2.	2.	2.	2.	2.
2.	2.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2675.	1800.	655.	227.	32701.
CMS	76.	53.	19.	6.	928.
INCHES		3.39	4.78	4.98	4.98
MM		86.18	121.39	126.48	126.48
HECTARES		942.	1299.	1354.	1354.
THOUS CU M		1136.	1603.	1670.	1670.

HYDROGRAPH AT STA 1 FOR PLAN 1, RIIC 2

3.	3.	3.	3.	3.	2.	2.	2.	2.	2.
4.	4.	7.	22.	51.	89.	129.	163.	189.	209.

4530.	4039.	3674.	3322.	3047.	2781.	2568.	2352.	2165.	2000.
2098.	1934.	1802.	1716.	1613.	1500.	1341.	1262.	1231.	1202.
1175.	1150.	1127.	1105.	1094.	1085.	1076.	1068.	1061.	1054.
1048.	1042.	1036.	1032.	1028.	1024.	1020.	1016.	1012.	1008.
1004.	1000.	996.	992.	988.	984.	980.	976.	972.	968.
964.	960.	956.	952.	948.	944.	940.	936.	932.	928.
924.	920.	916.	912.	908.	904.	900.	896.	892.	888.
884.	880.	876.	872.	868.	864.	860.	856.	852.	848.
844.	840.	836.	832.	828.	824.	820.	816.	812.	808.
804.	800.	796.	792.	788.	784.	780.	776.	772.	768.
764.	760.	756.	752.	748.	744.	740.	736.	732.	728.
724.	720.	716.	712.	708.	704.	700.	696.	692.	688.
684.	680.	676.	672.	668.	664.	660.	656.	652.	648.
644.	640.	636.	632.	628.	624.	620.	616.	612.	608.
604.	600.	596.	592.	588.	584.	580.	576.	572.	568.
564.	560.	556.	552.	548.	544.	540.	536.	532.	528.
524.	520.	516.	512.	508.	504.	500.	496.	492.	488.
484.	480.	476.	472.	468.	464.	460.	456.	452.	448.
444.	440.	436.	432.	428.	424.	420.	416.	412.	408.
404.	400.	396.	392.	388.	384.	380.	376.	372.	368.
364.	360.	356.	352.	348.	344.	340.	336.	332.	328.
324.	320.	316.	312.	308.	304.	300.	296.	292.	288.
284.	280.	276.	272.	268.	264.	260.	256.	252.	248.
244.	240.	236.	232.	228.	224.	220.	216.	212.	208.
204.	200.	196.	192.	188.	184.	180.	176.	172.	168.
164.	160.	156.	152.	148.	144.	140.	136.	132.	128.
124.	120.	116.	112.	108.	104.	100.	96.	92.	88.
84.	80.	76.	72.	68.	64.	60.	56.	52.	48.
44.	40.	36.	32.	28.	24.	20.	16.	12.	8.
4.	0.	0.	0.	0.	0.	0.	0.	0.	0.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	4661.	3255.	1146.	398.	57332.
CMS	133.	92.	32.	11.	1623.
INCHES		5.94	8.36	8.71	8.71
MM		150.91	212.44	221.34	221.35
AC-FT		1814.	2274.	2369.	2369.
THOUS CU M		1991.	2805.	2922.	2922.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 3

5.	4.	4.	4.	4.	3.	3.	3.	3.	3.
2.	3.	10.	32.	73.	127.	184.	233.	270.	298.
319.	338.	348.	357.	409.	574.	891.	1345.	1875.	2410.
2929.	3600.	4002.	5748.	6495.	6000.	6269.	5503.	4665.	3801.
4997.	4335.	1382.	1451.	1162.	943.	773.	660.	616.	575.
530.	500.	467.	438.	408.	379.	354.	330.	308.	287.
270.	253.	238.	216.	203.	190.	177.	165.	154.	144.
134.	125.	117.	109.	102.	95.	88.	83.	77.	72.
67.	63.	59.	54.	51.	47.	44.	41.	38.	36.
34.	31.	29.	27.	25.	24.	22.	21.	19.	18.
17.	16.	15.	14.	13.	12.	11.	10.	10.	9.
8.	8.	7.	7.	6.	6.	6.	5.	5.	4.
4.	4.	4.	3.	3.	3.	3.	3.	2.	2.
2.	2.	2.	2.	2.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	6006.	4650.	1638.	569.	81903.
CMS	169.	132.	46.	16.	2319.
INCHES		8.48	11.95	12.45	12.45
MM		215.44	303.48	316.19	316.21
AC-FT		2300.	3246.	3384.	3384.
THOUS CU M		2844.	4007.	4174.	4175.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 4

6.	5.	5.	5.	5.	4.	4.	4.	4.	3.
3.	3.	12.	41.	94.	165.	239.	303.	351.	388.
415.	438.	452.	464.	531.	746.	1159.	1748.	2437.	3134.
3898.	4683.	5207.	7469.	8444.	8694.	8149.	7154.	6064.	4941.
3896.	3435.	2382.	1836.	1519.	1225.	1005.	858.	801.	747.
697.	650.	607.	568.	524.	493.	460.	429.	400.	374.
345.	325.	303.	283.	264.	245.	230.	215.	200.	187.
174.	163.	154.	142.	132.	123.	115.	107.	100.	93.
87.	81.	76.	71.	66.	62.	57.	54.	50.	47.

22.	21.	19.	18.	17.	15.	14.	13.	13.	12.
11.	10.	9.	9.	8.	8.	7.	7.	6.	6.
5.	5.	5.	4.	4.	4.	4.	3.	3.	3.
3.	3.	2.	2.	2.	2.	2.	2.	2.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	9694.	8043.	2129.	739.	106474.
CMS	246.	171.	60.	21.	3015.
INCHES		11.03	15.53	16.16	16.16
MM		280.07	394.53	411.05	411.07
AC-FT		2996.	4223.	4400.	4400.
THOUS CU M		3696.	5209.	5427.	5427.

HYDROGRAPH AT STA 1 FOR PLAN 1, RIIO 5

8.	7.	7.	6.	6.	5.	5.	5.	4.	4.
4.	4.	15.	51.	116.	203.	295.	373.	432.	477.
511.	537.	557.	574.	654.	919.	1426.	2151.	2999.	3857.
4547.	5145.	7492.	9193.	10393.	10730.	10030.	8804.	7463.	6081.
4795.	3735.	2931.	2321.	1859.	1506.	1230.	1056.	965.	919.
886.	850.	747.	657.	606.	607.	566.	528.	493.	460.
429.	401.	375.	349.	325.	303.	283.	264.	246.	230.
214.	200.	187.	174.	163.	152.	142.	132.	123.	115.
107.	100.	93.	87.	81.	76.	71.	66.	62.	57.
54.	50.	47.	44.	41.	38.	35.	33.	31.	29.
27.	25.	23.	22.	20.	19.	18.	17.	15.	14.
13.	13.	12.	11.	10.	9.	9.	8.	8.	7.
7.	6.	6.	5.	5.	5.	4.	4.	4.	4.
3.	3.	3.	3.	3.	2.	2.	2.	2.	2.
2.	2.	1.	1.	1.	1.	1.	1.	1.	1.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	10700.	7440.	2020.	910.	131045.
CMS	303.	211.	74.	26.	3711.
INCHES		13.57	19.12	19.22	19.92
MM		344.70	485.57	505.91	505.93
AC-FT		3689.	5197.	5415.	5415.
THOUS CU M		4551.	6411.	6679.	6679.

HYDROGRAPH AT STA 1 FOR PLAN 1, RIIO 6

10.	9.	8.	8.	7.	7.	6.	6.	5.	5.
5.	5.	19.	64.	145.	254.	368.	466.	540.	597.
639.	671.	696.	714.	818.	1148.	1783.	2689.	3749.	4821.
5658.	7312.	9365.	11491.	12991.	13375.	12537.	11006.	9329.	7601.
5994.	4669.	3664.	2902.	2324.	1865.	1545.	1320.	1232.	1149.
1072.	1001.	934.	871.	813.	758.	708.	660.	616.	575.
536.	500.	467.	435.	406.	379.	354.	330.	308.	287.
268.	250.	233.	218.	203.	190.	177.	165.	154.	144.
134.	125.	117.	109.	102.	95.	88.	83.	77.	72.
67.	63.	59.	54.	51.	47.	44.	41.	38.	36.
34.	31.	29.	27.	25.	24.	22.	21.	19.	18.
17.	16.	15.	14.	13.	12.	11.	10.	10.	9.
8.	8.	7.	7.	6.	6.	6.	5.	5.	4.
4.	4.	4.	3.	3.	3.	3.	3.	2.	2.
2.	2.	2.	2.	2.	1.	1.	1.	1.	1.

CFS	13375.	9330.	3275.	1137.	103000.
CMS	379.	264.	93.	32.	4838.
INCHES		10.90	23.90	24.90	24.90
MM		430.88	606.97	632.39	632.42
AC-FT		4612.	6496.	6769.	6769.
THOUS CU M		5069.	8013.	8349.	8349.

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HYDROGRAPH ROUTING

ROUTING OF INFLOW HYDROGRAPH

ISTAO	ICOMP	ICOMB	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPAP		LSTR
0.0	0.000	0.00	1	1	0	0		0

NSTPS	NSTOL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1.	0

STORAGE	0.00	550.00	1170.00	1820.00	2150.00	2500.00	2730.00	3240.00	3630.00	4040.00
	4440.00									
OUTFLOW	0.00	50.00	140.00	252.00	308.00	364.00	392.00	972.00	2720.00	5148.00
	9261.00									

STATION 2, PLAN 1, RTIO 1

OUTFLOW

2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	3.	3.	3.	3.
4.	4.	5.	5.	6.	7.	8.	9.	12.	15.
116.	125.	147.	151.	133.	135.	130.	137.	101.	110.
139.	134.	139.	140.	140.	140.	140.	140.	138.	138.
140.	139.	139.	139.	136.	138.	138.	137.	140.	140.
136.	135.	135.	134.	134.	133.	133.	132.	137.	136.
130.	130.	129.	128.	126.	127.	126.	126.	131.	131.
119.	123.	122.	122.	121.	120.	120.	119.	125.	124.
117.	116.	116.	115.	114.	114.	113.	113.	118.	118.
111.	110.	109.	109.	108.	107.	107.	106.	112.	111.
104.	104.	103.	102.	102.	101.	101.	100.	106.	105.
96.	96.	97.	97.	96.	95.	95.	94.	99.	99.
93.	92.	92.	91.	90.	90.	89.	89.	94.	93.
								88.	88.

STOR

41.	41.	41.	41.	21.	41.	21.	21.	21.	21.
41.	41.	41.	41.	22.	43.	26.	29.	33.	38.
93.	96.	93.	99.	85.	73.	85.	103.	129.	164.
407.	261.	329.	414.	513.	620.	724.	818.	898.	984.
1015.	1050.	1083.	1105.	1121.	1133.	1142.	1148.	1153.	1157.
1104.	1103.	1106.	1107.	1108.	1109.	1109.	1109.	1109.	1108.
1107.	1103.	1104.	1102.	1099.	1097.	1094.	1091.	1116.	1145.

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   1058.     1053.     1049.     1044.     1040.     1035.     1031.     1026.     1022.     1017.
   1012.     1008.     1003.      999.      994.      990.      985.      981.      976.      972.
    967.      963.      958.      954.      950.      945.      941.      937.      933.      928.
    924.      920.      916.      911.      907.      903.      899.      895.      891.      887.
    883.      879.      875.      871.      867.      863.      859.      855.      851.      847.
    843.      840.      836.      832.      828.      825.      821.      817.      814.      810.

                                          STAGE
     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
     0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0

                              PEAK    6-HOUR    24-HOUR    72-HOUR    TOTAL VOLUME
                     CFS      140.      140.       135.        95.          13664.
                     CMS        4.        4.         4.         3.            387.
                  INCHES                0.25       0.99       2.06            2.06
                      MM                6.47      24.93      52.72           52.75
                   AC-FT                 69.       267.       504.            505.
              THOUS CU M                 85.       329.       696.            696.


                               MAXIMUM STORAGE =      1169.

                               STATION       2, PLAN 1, RTIO 2

                                          OUTFLOW
      3.        3.        3.        3.        3.        3.        3.        3.        3.        3.
      3.        3.        3.        3.        3.        4.        4.        5.        5.        6.
      7.        8.        8.        9.       10.       12.       13.       16.       21.       26.
     33.       42.       58.       75.      100.      127.      156.      184.      208.      228.
    243.      255.      263.      269.      273.      276.      278.      280.      281.      282.
    283.      283.      284.      284.      284.      284.      284.      283.      283.      282.
    282.      281.      280.      280.      279.      278.      277.      276.      275.      273.
    272.      271.      270.      268.      267.      266.      264.      263.      262.      260.
    259.      257.      256.      254.      253.      251.      250.      248.      247.      245.
    244.      242.      240.      239.      237.      236.      234.      233.      231.      230.
    228.      226.      225.      223.      222.      220.      219.      217.      216.      214.
    213.      211.      210.      208.      207.      206.      204.      203.      201.      200.
    199.      197.      195.      194.      193.      192.      190.      189.      188.      186.
    185.      184.      182.      181.      180.      179.      177.      176.      175.      174.
    172.      171.      170.      169.      168.      166.      165.      164.      163.      162.

                                          STOR
     37.       37.       37.       37.       37.       37.       36.       36.       36.       36.
     36.       35.       35.       37.       38.       41.       45.       51.       58.       66.
     75.       84.       93.      103.      114.      125.      148.      180.      226.      287.
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   1768.     1835.     1885.     1921.     1948.     1967.     1980.     1990.     1996.     2002.
   2006.     2010.     2012.     2013.     2014.     2013.     2012.     2010.     2008.     2005.
   2001.     1997.     1993.     1987.     1982.     1976.     1970.     1964.     1957.     1950.
   1943.     1935.     1927.     1920.     1912.     1903.     1895.     1887.     1878.     1869.
   1861.     1852.     1843.     1834.     1825.     1816.     1807.     1798.     1789.     1780.
   1771.     1762.     1753.     1744.     1735.     1726.     1716.     1707.     1698.     1689.
   1681.     1672.     1663.     1654.     1645.     1636.     1628.     1619.     1610.     1602.
   1593.     1584.     1576.     1568.     1559.     1551.     1542.     1534.     1526.     1518.
   1510.     1502.     1494.     1486.     1478.     1470.     1462.     1454.     1447.     1439.
   1431.     1424.     1416.     1409.     1401.     1394.     1387.     1380.     1372.     1365.
   1358.     1351.     1344.     1337.     1330.     1323.     1316.     1310.     1303.     1296.

                                                STAGE
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0

                              PEAK    6-HOUR    24-HOUR    72-HOUR    TOTAL VOLUME
                    CFS       284.      283.       271.       186.          26653.
                    CMS         8.        8.         8.         5.            755.
                 INCHES                 0.52       1.98       4.08            4.08
                     MM                13.12      50.21     103.61          103.67
                  AC-FT                 140.       537.      1109.           1110.
             THOUS CU M                 173.       663.      1368.           1369.


                                 MAXIMUM STORAGE =      2014.


                                 STATION       2, PLAN 1, RTIO 3

                                               OUTFLOW
     5.        5.        5.        5.        5.        5.        5.        5.        5.        5.
     5.        5.        5.        5.        5.        5.        6.        7.        8.        9.
    10.       11.       12.       13.       15.       17.       19.       23.       29.       37.
    47.       65.       89.      120.      159.      205.      249.      287.      320.      346.
   366.      374.      385.      399.      440.      469.      486.      497.      503.      508.
   510.      510.      509.      506.      502.      497.      491.      485.      477.      469.
   460.      451.      441.      431.      421.      411.      400.      392.      391.      389.
   388.      387.      385.      384.      383.      381.      380.      378.      377.      375.
   374.      372.      371.      369.      368.      366.      364.      362.      360.      358.
   356.      353.      351.      349.      347.      345.      343.      340.      338.      336.
   334.      332.      330.      327.      325.      323.      321.      319.      317.      315.
   313.      311.      309.      307.      304.      302.      300.      298.      296.      294.
   293.      291.      289.      287.      285.      283.      281.      279.      277.      275.
   273.      272.      270.      265.      265.      264.      263.      261.      259.      257.
   256.      254.      252.      250.      249.      247.      245.      243.      242.      240.
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                                                  STOR
     52.        52.        52.        52.        52.        52.        52.        52.        52.        52.
     52.        52.        52.        52.        54.        58.        65.        73.        83.        94.
    107.       120.       134.       145.       163.       182.       212.       257.       323.       410.
    516.       552.       621.      1032.      1250.      1544.      1803.      2035.      2232.      2394.
   2519.      2614.      2694.      2736.      2773.      2797.      2813.      2822.      2828.      2832.
   2834.      2834.      2833.      2831.      2827.      2823.      2817.      2811.      2805.      2797.
   2790.      2782.      2773.      2764.      2756.      2746.      2737.      2728.      2718.      2708.
   2698.      2687.      2677.      2665.      2654.      2642.      2630.      2618.      2606.      2593.
   2581.      2568.      2555.      2542.      2529.      2516.      2503.      2489.      2476.      2463.
   2450.      2436.      2423.      2410.      2396.      2383.      2370.      2357.      2343.      2330.
   2317.      2304.      2291.      2278.      2265.      2252.      2239.      2227.      2214.      2201.
   2189.      2176.      2164.      2151.      2139.      2126.      2114.      2102.      2090.      2078.
   2066.      2054.      2042.      2031.      2019.      2007.      1996.      1984.      1973.      1962.
   1950.      1939.      1928.      1917.      1906.      1895.      1884.      1874.      1863.      1852.
   1842.      1831.      1821.      1810.      1800.      1790.      1780.      1770.      1760.      1750.

                                                  STAGE
     0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
     0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
     0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
     0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
     0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
     0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
     0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
     0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
     0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
     0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
     0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
     0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
     0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
     0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0
     0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0        0.0

                                  PEAK    6-HOUR    24-HOUR    72-HOUR    TOTAL VOLUME
                       CFS        510.      509.       424.       283.           40822.
                       CMS         14.       14.        12.         8.            1156.
                    INCHES                  0.91       3.09       6.20             6.20
                        MM                 23.17      78.52     157.51           157.51
                     AC-FT                  248.       840.      1686.            1687.
                THOUS CU M                  306.      1037.      2080.            2081.


                                  MAXIMUM STORAGE =       2834.


                                  STATION       2, PLAN 1, RTIO 4

                                                  OUTFLOW
      6.         6.         6.         6.         6.         6.         6.         6.         6.         6.
      6.         6.         6.         6.         6.         7.         8.         9.        10.        11.
     13.        14.        16.        17.        19.        22.        25.        30.        38.        48.
     68.        93.       125.       169.       225.       282.       338.       381.       580.       806.
    971.      1353.      1516.      1704.      1703.      1646.      1556.      1450.      1345.      1248.
   1159.      1077.      1001.       961.       942.       922.       902.       881.       859.       837.
    816.       794.       772.       750.       728.       706.       685.       663.       642.       622.
    602.       582.       562.       543.       524.       506.       488.       471.       454.       438.
    422.       406.       392.       390.       389.       387.       385.       384.       382.       380.
    379.       377.       375.       374.       372.       370.       369.       367.       365.       363.
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   338.      336.      334.      332.      329.      327.      325.      323.      321.      319.
   316.      314.      312.      310.      308.      306.      304.      302.      300.      298.
   296.      294.      292.      290.      288.      286.      284.      282.      280.      278.
   277.      275.      273.      271.      269.      267.      266.      264.      262.      260.

                                          STOR
    66.       66.       66.       66.       66.       66.       66.       68.       68.       67.
    67.       67.       67.       68.       71.       76.       84.       95.      108.      123.
   139.      156.      174.      192.      212.      237.      276.      345.      420.      533.
   674.      847.     1007.     1341.     1662.     2005.     2340.     2642.     2695.     3094.
  3239.     3334.     3364.     3403.     3403.     3390.     3370.     3347.     3323.     3302.
  3282.     3263.     3246.     3230.     3213.     3196.     3178.     3160.     3141.     3122.
  3102.     3083.     3064.     3044.     3025.     3006.     2987.     2969.     2950.     2932.
  2914.     2897.     2880.     2863.     2846.     2830.     2815.     2800.     2785.     2770.
  2756.     2743.     2729.     2716.     2703.     2690.     2676.     2662.     2649.     2635.
  2621.     2607.     2593.     2579.     2565.     2551.     2537.     2523.     2509.     2495.
  2481.     2467.     2453.     2439.     2426.     2412.     2398.     2384.     2371.     2357.
  2343.     2330.     2316.     2303.     2290.     2277.     2263.     2250.     2237.     2224.
  2211.     2199.     2186.     2173.     2161.     2148.     2136.     2123.     2111.     2099.
  2087.     2074.     2062.     2050.     2039.     2027.     2015.     2004.     1992.     1980.
  1969.     1958.     1946.     1935.     1924.     1913.     1902.     1891.     1880.     1870.

                                          STAGE
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
    0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0

                          PEAK    6-HOUR    24-HOUR    72-HOUR   TOTAL VOLUME
                 CFS     1704.     1407.       839.       436.         62874.
                 CMS       48.       40.        24.        12.          1780.
              INCHES                2.57       6.12       9.55           9.56
                  MM               65.17     155.53     242.62         242.74
               AC-FT                698.      1665.      2597.          2598.
         THOUS CU M                 860.      2053.      3203.          3205.


                            MAXIMUM STORAGE =      3403.


                            STATION       2, PLAN 1, RTIO 5

                                          OUTFLOW
     8.        8.        8.        8.        8.        8.        8.        8.        8.        8.
     8.        8.        8.        8.        8.        8.        9.       11.       12.       14.
    16.       17.       19.       21.       24.       27.       31.       37.       47.       65.
    91.      121.      164.      222.      289.      358.      557.      963.     2156.     3001.
  3532.     3642.     3614.     3599.     3113.     2602.     2541.     2305.     2087.     1895.
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   899.     877.     854.     832.     809.     786.     764.     741.     719.     697.
   675.     654.     632.     612.     591.     571.     552.     533.     514.     496.
   476.     461.     444.     428.     412.     397.     391.     389.     388.     386.
   384.     383.     381.     379.     378.     376.     374.     373.     371.     369.
   367.     366.     364.     362.     359.     357.     355.     352.     350.     348.
   346.     343.     341.     339.     337.     334.     332.     330.     328.     326.
   324.     321.     319.     317.     315.     313.     311.     309.     307.     305.
   303.     301.     299.     297.     295.     293.     291.     289.     287.     285.
   283.     281.     279.     277.     275.     273.     272.     270.     268.     266.

                                         STOR
    84.      84.      84.      84.      84.      84.      83.      83.      83.      83.
    83.      83.      83.      84.      87.      93.     103.     117.     133.     151.
   171.     192.     211.     236.     260.     292.     339.     412.     516.     656.
   829.    1042.    1312.    1649.    2043.    2465.    2875.    3232.    3504.    3677.
  3767.    3794.    3781.    3745.    3696.    3644.    3590.    3537.    3489.    3446.
  3406.    3374.    3344.    3317.    3292.    3271.    3251.    3232.    3214.    3195.
  3176.    3156.    3137.    3117.    3097.    3077.    3057.    3037.    3017.    2998.
  2979.    2960.    2941.    2923.    2905.    2888.    2871.    2854.    2837.    2822.
  2806.    2791.    2776.    2762.    2748.    2734.    2721.    2708.    2694.    2681.
  2667.    2654.    2640.    2626.    2612.    2598.    2584.    2570.    2556.    2542.
  2528.    2514.    2500.    2486.    2472.    2458.    2444.    2430.    2416.    2402.
  2388.    2375.    2361.    2348.    2334.    2321.    2307.    2294.    2281.    2267.
  2254.    2241.    2228.    2215.    2202.    2190.    2177.    2164.    2152.    2139.
  2127.    2115.    2102.    2090.    2078.    2066.    2054.    2042.    2030.    2019.
  2007.    1995.    1984.    1973.    1961.    1950.    1939.    1928.    1916.    1905.

                                        STAGE
   0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
   0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
   0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
   0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
   0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
   0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
   0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
   0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
   0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
   0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
   0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
   0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
   0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
   0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0
   0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0      0.0

                        PEAK    6-HOUR   24-HOUR   72-HOUR   TOTAL VOLUME
                 CFS    3692.    2827.     1322.      604.         86959.
                 CMS     105.      80.       37.       17.          2462.
              INCHES              5.16      9.65     13.21          13.22
                  MM            130.96    244.99    335.56         335.73
               AC-FT             1402.     2622.     3592.          3593.
          THOUS CU M             1729.     3234.     4430.          4432.

                        MAXIMUM STORAGE =     3794.

                        STATION       2, PLAN 1, RTIO 6

                                    OUTFLOW
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       9.        9.        9.       10.       10.       11.       12.       13.       15.       17.
      19.       22.       24.       27.       30.       33.       39.       47.       64.       89.
     120.      163.      221.      291.      370.      761.     2330.     4277.     5815.     6748.
    6765.     6261.     5524.     4692.     4395.     3896.     3420.     2987.     2638.     2392.
    2175.     1982.     1819.     1656.     1518.     1394.     1282.     1181.     1089.     1005.
     966.      940.      919.      898.      876.      853.      831.      809.      786.      764.
     741.      719.      697.      676.      654.      633.      613.      592.      572.      553.
     534.      515.      497.      480.      462.      446.      429.      414.      398.      391.
     389.      388.      386.      385.      383.      381.      380.      378.      376.      374.
     373.      371.      369.      368.      366.      364.      362.      360.      357.      355.
     353.      350.      348.      346.      344.      341.      339.      337.      335.      332.
     330.      328.      326.      324.      322.      319.      317.      315.      313.      311.
     309.      307.      305.      303.      301.      299.      297.      295.      293.      291.
     289.      287.      285.      283.      281.      279.      277.      275.      274.      272.

                                                 STOR
     105.      105.      105.      105.      104.      104.      104.      104.      104.      104.
     104.      103.      104.      105.      109.      117.      129.      146.      166.      189.
     214.      240.      267.      295.      326.      365.      424.      515.      645.      819.
    1036.     1302.     1635.     2059.     2551.     3072.     3543.     3893.     4105.     4195.
    4157.     4142.     4076.     3997.     3913.     3829.     3748.     3675.     3612.     3557.
    3506.     3465.     3427.     3393.     3362.     3334.     3309.     3287.     3266.     3247.
    3230.     3212.     3193.     3175.     3155.     3136.     3116.     3096.     3077.     3057.
    3037.     3018.     2999.     2979.     2961.     2942.     2924.     2906.     2889.     2872.
    2855.     2839.     2823.     2807.     2792.     2777.     2763.     2749.     2736.     2722.
    2709.     2695.     2682.     2669.     2655.     2641.     2627.     2613.     2600.     2586.
    2572.     2558.     2544.     2529.     2515.     2501.     2487.     2473.     2459.     2445.
    2431.     2418.     2404.     2390.     2376.     2363.     2349.     2336.     2322.     2309.
    2295.     2282.     2269.     2256.     2243.     2230.     2217.     2204.     2191.     2178.
    2166.     2153.     2141.     2128.     2116.     2104.     2092.     2079.     2067.     2055.
    2044.     2032.     2020.     2008.     1997.     1985.     1974.     1962.     1951.     1940.

                                                 STAGE
      0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
      0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
      0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
      0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
      0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
      0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
      0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
      0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
      0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
      0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
      0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
      0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
      0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
      0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0
      0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0       0.0

                         PEAK    6-HOUR    24-HOUR    72-HOUR   TOTAL VOLUME
               CFS      6765.     4783.      1975.       829.        119393.
               CMS       192.      135.        56.        23.          3381.
            INCHES                 8.73      14.41      18.14          18.15
                MM               221.80     365.94     460.76         460.95
             AC-FT                2375.      3917.      4932.          4934.
        THOUS CU M                2929.      4831.      6083.          6085.

                           MAXIMUM STORAGE =      4197.
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PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6
				RATIOS APPLIED TO FLOWS					
				0.20	0.35	0.50	0.65	0.80	1.00
HYDROGRAPH AT	1	5.10	1	2675.	4681.	6688.	8694.	10700.	13375.
	(	13.21)	(	75.75)(	132.56)(	189.37)(	246.18)(	302.99)(	378.74 (
ROUTED TO	2	5.10	1	140.	264.	519.	1704.	3692.	6765.
	(	13.21)	(	3.96)(	8.04)(	14.45)(	48.24)(	104.55)(	191.57)(

APPENDIX D

AVAILABLE DOCUMENTS

Art. 52

NOTICE: After filling out one of these forms as completely as possible for each dam in your district, return it at once to the Conservation Commission, Albany.

STATE OF NEW YORK

CONSERVATION COMMISSION

ALBANY

Map 2-13.

405 A11

DAM REPORT

June 26, 1915.
(Date)

CONSERVATION COMMISSION,

DIVISION OF INLAND WATERS.

GENTLEMEN:

I have the honor to make the following report in relation to the structure known as the Swartz Findley Lake Dam.

This dam is situated upon the French Creek
(Give name of stream)
in the Town of Mina, Chautauqua County,
about in from the Village ~~or City~~ of Findley Lake
(State distance)
The distance down stream from the dam, to the Main St Bridge,
(Up or down) (Give name of nearest important stream or bridge)
is about over the dam
(State distance)

The dam is now owned by L. H. Swartz
(Give name and address in full)
and was built in or about the year 1820, and was extensively repaired or reconstructed during the year 1903.

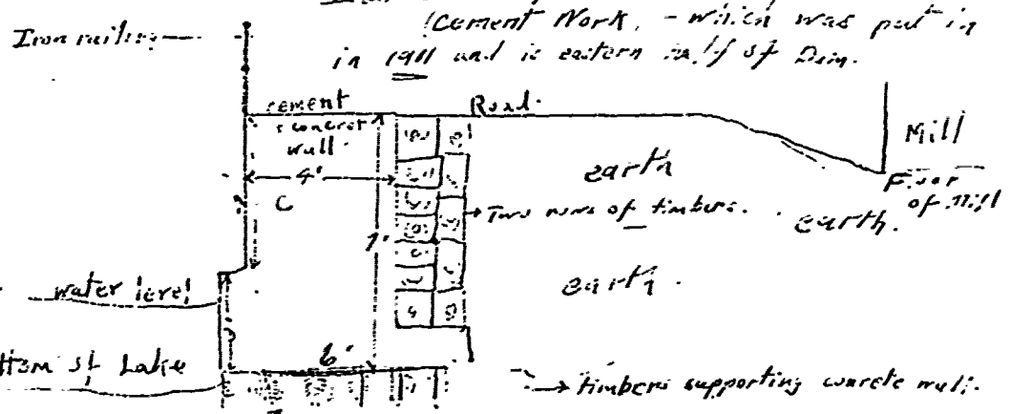
As it now stands, the spillway portion of this dam is built of timber and concrete (flume)
(State whether of masonry, concrete or timber)
and the other portions are built of concrete and timber
(State whether of masonry, concrete, earth or timber with or without rock fill)

As nearly as I can learn, the character of the foundation bed under the spillway portion of the dam is earth and rock and under the remaining portions such foundation bed is earth and rock.

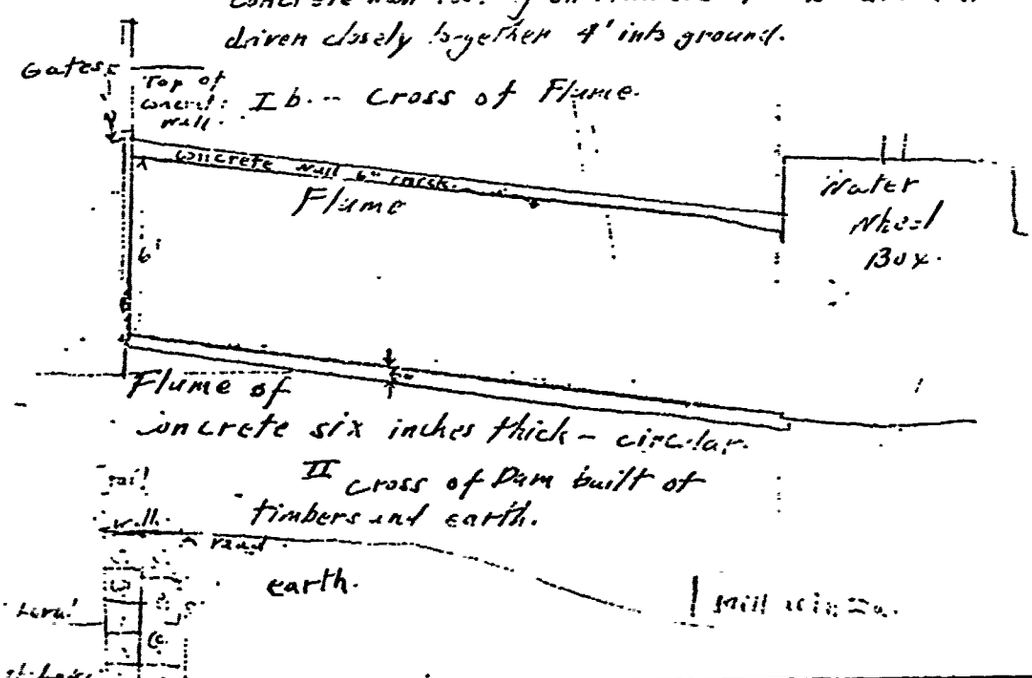
On the space below, make one sketch showing the form and dimensions of a cross section through the spillway or waste-weir of this dam, and a second sketch showing the same information for a cross section through the other portion of the dam. Show particularly the greatest height of the dam above the stream bed, its thickness at the top, and thickness at the bottom, as nearly as you can learn.)

Cross-section of Flume, which acts as Spillway and Dam.

I. a. Cross of Dam (Cement Work, - which was put in in 1911 and is eastern wall of Dam.



Concrete wall resting on timbers 1' to 2" diameter driven closely together 4' into ground.

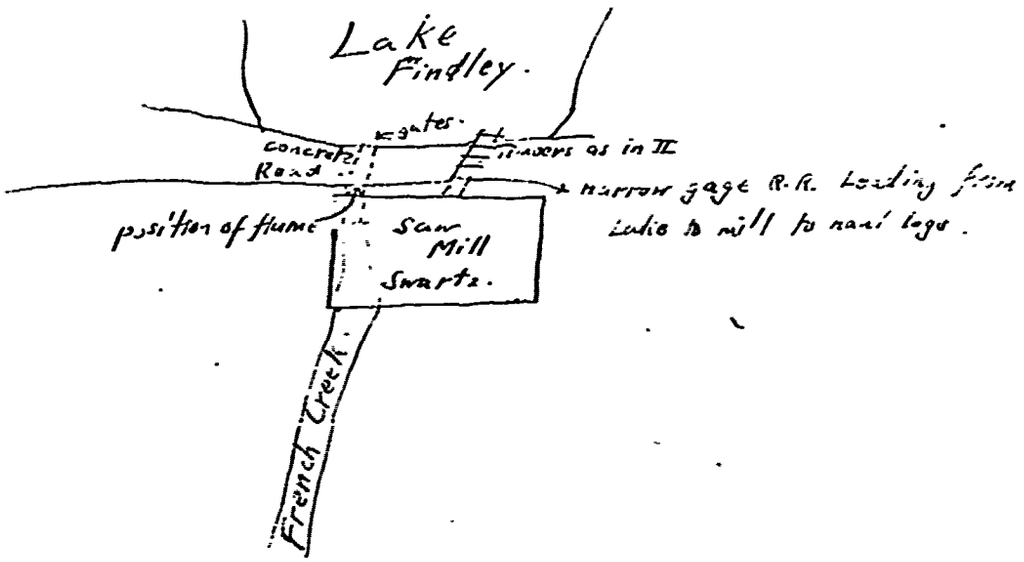


II Cross of Dam built of timbers and earth.

(In the space below, make a third sketch showing the general plan of the dam, and its approximate position in relation to buildings or other conspicuous objects in the vicinity.)

III

General Plan of Dam and Surroundings.



The total length of this dam is 120 feet. The spillway or waste-weir portion, is a flume 6' wide in clear feet long, and the crest of the spillway is about by gates as the water is needed or as it rises feet below the top of the dam.

The number, size and location of discharge pipes, waste pipes or gates which may be used for drawing off the water from behind the dam, are as follows: The flume in above statement is used to regulate the flow and the amount of water behind dam. The Gate does not use a great deal.

At the time of this inspection the water level above the dam was 2 ft in. below bottom flume. above the crest of the spillway.

(State briefly, in the space below, whether, in your judgment, this dam is in good condition, or bad condition, describing particularly any leaks or cracks which you may have observed.)

This dam is in good condition. It controls the outlet of Frilley Lake. The part through which the flume is constructed is concrete and stone, as in Drawing I a. There is no danger of a break-away, as the lake does not rise but two feet or so, at the heaviest rains, and ice does not trouble them. There are no buildings endangered in case of a breakaway except Swartz mill itself.

Reported by Carl B Logan
(Signature)

Box 497
(Address—Street and number, P. O. Box or R. F. D. route)

Homer N Y.
(Name of place)

Findley Lake Navigation Rules And Regulations

I. APPLICATION OF RULES AND REGULATIONS

1. These rules and regulations shall apply to navigation on and use of the waters of Findley Lake.

2. The words "motor boat" as used in these rules and regulations shall mean any vessel propelled by machinery, including outboard motors.

II. GENERAL RULES

1. Motor boats operated by persons under 16 years of age shall be operated only with the consent of the owner of said motor boat who assumes all responsibility for full compliance with these rules and regulations. It is further stipulated that the owner of said motor boat shall instruct such persons as to the safe operation of said motor boat and as to the operator's full knowledge of these rules and regulations.

2. Every motor boat navigated on the waters of Findley Lake shall be so constructed that the vision of the navigator is unobstructed from any position which he may occupy while so navigating.

3 Every boat for hire and every boat carrying passengers for hire shall carry for every person on board either a life preserver, a life belt or a buoyant cushion, so placed as to be readily accessible at all times, and of such type as is approved by the United States board of supervising inspectors.

4 All motor boats shall be equipped with and shall use a muffler through which the engine shall exhaust, so constructed and used as to muffle the exhaust in a reasonable manner.

5. All motor boats navigating the waters of Findley Lake shall be registered and numbered annually by the Commissioners of Navigation. Such registration shall be made by such Commissioners of Navigation upon presentation to them of an application in writing signed by the owner or his agent of said motor boat to be so registered. Such application shall contain the name of the owner of the motor boat to be registered, the name of the motor boat, if it has a name, its length, breadth and depth. Said application shall be accompanied by the payment to the said Commissioners of Navigation, if such motor boat is under sixteen feet in length the sum of $.75; if said motor boat is sixteen feet or over and less than 26 feet the sum of $1 50; and if said motor boat is 26 feet or over the sum of $3.00. On receipt of such application and fee, said Commissioners of Navigation shall register such motor boat in a book kept for that purpose and deliver to the owner or his agent a certificate of registration assigning numbers to be affixed to said motor boat by the owner or his agent. The certificate shall be signed by one of the Commissioners and sealed with the seal of said Commissioners. The owner, or his agent, before using said boat, shall cause to be plainly marked the registration number assigned to said boat on both sides of its bow in figures not less than three inches high and of such dimensions and contrast in color as to be easily distinguished at a distance of 100 feet. The registration certificate shall at all times be in the possession of the person operating a motor boat on the waters of Findley Lake.

6. All boats not for hire shall so far as practicable keep out of the way of all boats carrying passengers for hire, especially when such boats are approaching docks or making landings. All boats carrying passengers for hire shall have the letter "H" conspicuously displayed to indicate such fact.

7. The loading of any type of water craft in excess of its safe rated capacity is prohibited.

8. No person shall operate or use any water craft on the waters of Findley Lake while in an intoxicated condition.

III. SPEED REGULATIONS

1. No motor boat shall navigate at a speed exceeding five miles per hour when within a distance of one hundred feet from shore, : anchored fishing boat, bathing beach, canoe, rowboat or sailboat.

2. Reckless navigation and operation of water craft on the waters of Findley Lake is prohibited. Reckless navigation shall mea.. the operating or using of any water craft in a manner which unreasonably interferes with the free and proper use of the waters of Findley Lake, or which unreasonably endangers users of the above-mentioned waters.

IV. RULES OF THE ROAD AND SIGNALS

1. Every motor boat shall keep out of the way of any sailboat, rowboat, canoe or boat being used for trolling. In order to facilitate the motor boat in so doing, such sailboat, rowboat, canoe or trolling boat shall, so far as possible, maintain its course and speed. A sailing vessel shall in like manner, so far as possible, keep out of the way of any rowboat or canoe, and the rowboat or canoe shall, so far as possible, maintain its course and speed.

2. When two motor boats are meeting end on, or nearly so, so as to involve risk of collision, each shall keep to the right and they shall pass port to port (left to left) and, if necessary, shall alter course to do so. At night motor boats shall be deemed to be meeting end on, or nearly so, if each sees both the red light and the green light of the other, or if the red light of one is opposed to the red light of the other.

3. When two motor boats are meeting so far to starboard (right) of each other not to be meeting end on, or nearly so, each shall keep to the left and they shall pass starboard to starboard (right to right) and if necessary shall alter course to do so. At night this rule shall apply if the green light on one motor boat is opposed to the green light of the other.

4. If two motor boats are on crossing course so as to involve risk of collision, the motor boat which has the other on her own starboard (right) side shall keep out of the way and shall, if practicable, pass astern of the other.

5. A motor boat overtaking another from abaft the beam shall keep out of the way of the other and shall allow ample clearance, in no event less than one hundred feet.

6. When by any of these rules, one of two vessels is to keep out of the way, the other shall keep her course and speed.

7. Any motor boat, when approaching another motor boat, sailing vessel, rowboat, canoe or trolling boat, so as to involve risk of collision, shall slacken her speed, and if necessary, shall stop and if possible reverse her engine.

8. In construing these provisions, due regard must be had to all dangers of navigation and to all special circumstances which may exist rendering departure therefrom necessary in order to avoid immediate danger.

V. LIGHTS

1. All motor boats when on the lake, unless anchored or moored, between one-half hour after sunset and one-half hour before sunrise, shall display (a) on the right or starboard side, a green light so fixed and screened as to show the light from dead ahead to two points abaft the beam on the starboard side; (b) on the left or port side, a red light so fixed and screened as to show the light from dead ahead to two points abaft the beam on the port side; and (c) on the stern, a white light so fixed as to show the light from dead astern to two points abaft the beam on either side.

2. All rowboats, canoes and sailboats when navigating on the lake between one-half hour after sunset and one-half hour before sunrise shall be provided with a white light to be displayed upon the approach of any motor boat within a distance of five hundred feet.

3. Any boat lying at anchor in a position dangerous to navigation shall show, between one-half hour after sunset and one-half hour before sunrise, a similar white light, or lights required under subdivision one of this section.

4. All lights required by this section must have a visibility of at least one-quarter mile.

5. No lights other than those required hereunder shall be carried which may be mistaken for those prescribed by these rules.

6. No lights, required or permitted by the foregoing subdivisions of this section, shall be so strong or glaring as to blind the vision of navigators on the lake.

VI. EXCEPTIONS

1. The regulations herein contained as to speed and as to life preservers and mufflers, shall not apply to any motor boat while actually competing in a race on Findley Lake held under the auspices of a duly accredited association, and notice of which has been given to the local Commission of Navigation member by the association sponsoring such a race.

VII. BOAT OPERATORS

1. All motor boats carrying passengers or freight for hire or towing for hire, or who receive compensation of any kind or nature for such service shall not be operated or navigated except in charge of a person duly licensed for such service by the Board of Commissioners of Navigation of Chautauqua County.

2. Whenever any person shall, upon written application, apply to said Board of Commissioners for a certificate as captain, engineer or pilot to perform the duties thereof on any vessel to be run on Findley Lake, pursuant to the provisions of this act, the said Board shall examine said applicant as to his knowledge and experience in the position for which application is made, and also the proofs which he produces in evidence and support of his application; and, if, upon examination they are satisfied that he possesses a good moral character, that his habits of life are temperate, and that he possesses the requisite knowledge, experience and ability to perform the duties under this act of the position applied for they shall grant him duplicate certificates, under their hands and seal of their office, authorizing him to be employed and to work upon any such vessel for the term of one year from the date of such certificate; and the said Board of Commissioners shall not grant any certificate under this act to extend beyond the term of one year from the date thereof. One of said certificates shall be retained by such applicant and the other be delivered to the captain or owners of such vessel, who shall place the same in a conspicuous place in the vessel where it will be most likely to be observed by the passengers, and there to be at all times kept for inspection and examination.

3. Every captain, engineer and pilot who receives a license under this act shall, before entering upon his duties, take oath before one of said Commissioners, to be filed in the office of said Board, that he will faithfully and honestly, according to his best skill and judgment, without concealment or reservation, perform all the duties required of him by law.

4. The said Board of Commissioners shall, whenever they, or either of them, shall deem it expedient, visit any vessel licensed under this act, and examine into her condition for the purpose of ascertaining whether or not the provisions of this act have been complied with, and whether or not any party thereon, having a certificate from said Board of Commissioners, has conformed to and obeyed the conditions of such license and the provisions of this act; and the owner, engineer, pilot or captain of such vessel shall answer all reasonable inquiries, and give all the information in his or their power in regard to said vessel, her machinery, and the manner of managing both.

5. Every passenger boat for hire, shall carry ready for immediate use the number of fire extinguishers as required under the United States regulations.

VIII. DOCKS, WHARFS, FLOATS, AND DIVING DOCKS

1. No person or group of persons shall construct any dock, wharf, float or diving dock in such manner as to unreasonably interfere with the free and proper use of the navigable waters of Findley Lake, or place any dock, wharf, float or diving dock so as to unreasonably endanger other persons using said lake.

2. Piers and docks of a temporary nature (and not earth filled or concrete) may be built out into the lake from the high water mark to a distance of thirty feet. Such piers and docks shall be kept in safe condition.

3. There shall be maintained in each year from the first day of June to the first day of October, between one-half hour after sunset and one-half hour before sunrise, upon each dock, wharf, float or diving dock located and placed in the waters of Findley Lake where said waters are six or more feet in depth, a clear, distinct white light. In case of any failure to maintain such light during such period or any part thereof, the Commissioners of Navigation may prohibit the use of such dock or wharf and ask for the removal by the owner of same.

IX. BOATS FOR HIRE

1. No boat shall be let for hire unless a certificate has been obtained from the Board of Commissioners, approving the use of such boat for hire. Whenever any person shall upon written application to the Board of Commissioners apply for an inspection of any boats owned or operated by such applicant in order to ascertain as to whether the same can be safely used on Findley Lake, and shall issue a certificate to said applicant setting forth the passenger capacity of such boat and before such boat shall be let out for hire the owner shall cause to be plainly marked on such boat the number assigned thereto by the Commission in figures not less than three inches high and of such dimensions and contrasting color as to be easily distinguishable at a distance of one hundred feet.

X. PENALTIES

Any person violating any rule or regulation prescribed herein shall be guilty of a misdemeanor, and on conviction, shall be punishable by a fine, not to exceed two hundred dollars, or by imprisonment, not to exceed six months, or by both such fine and imprisonment; and provided further, that after the conviction of the owner or any person authorized by such owner to operate water craft belonging to said owner, of a violation of any of the rules or regulations prescribed herein, the license of any water craft owned by said owner may be suspended or revoked after a hearing, by the Chautauqua County Navigation Commission for a period of not less than ten days nor more than one year.

Dated: Jamestown, New York, May 9 1961

so navigating

3 Every boat for hire and every boat carrying passengers for hire shall carry for every person on board either a life preserver, a life belt or a buoyant cushion, so placed as to be readily accessible at all times, and of such type as is approved by the United States board of supervising inspectors.

4. All motor boats shall be equipped with and shall use a muffler through which the engine shall exhaust, so constructed and used as to muffle the exhaust in a reasonable manner.

5. All motor boats navigating the waters of Findley Lake shall be registered and numbered annually by the Commissioners of Navigation. Such registration shall be made by such Commissioners of Navigation upon presentation to them of an application in writing signed by the owner or his agent of said motor boat to be so registered. Such application shall contain the name of the owner of the motor boat to be registered, the name of the motor boat, if it has a name, its length, breadth and depth. Said application shall be accompanied by the payment to the said Commissioners of Navigation, if such motor boat is under sixteen feet in length the sum of $.75; if said motor boat is sixteen feet or over and less than 26 feet the sum of $1.50, and if said motor boat is 26 feet or over the sum of $3.00. On receipt of such application and fee, said Commissioners of Navigation shall register such motor boat in a book kept for that purpose and deliver to the owner or his agent a certificate of registration assigning numbers to be affixed to said motor boat by the owner or his agent. The certificate shall be signed by one of the Commissioners and sealed with the seal of said Commissioners. The owner, or his agent, before using said boat, shall cause to be plainly marked the registration number assigned to said boat on both sides of its bow in figures not less than three inches high and of such dimensions and contrast in color as to be easily distinguished at a distance of 100 feet. The registration certificate shall at all times be in the possession of the person operating a motor boat on the waters of Findley Lake.

6. All boats not for hire shall so far as practicable keep out of the way of all boats carrying passengers for hire, especially when such boats are approaching docks or making landings. All boats carrying passengers for hire shall have the letter "H" conspicuously displayed to indicate such fact.

7. The loading of any type of water craft in excess of its safe rated capacity is prohibited.

8. No person shall operate or use any water craft on the waters of Findley Lake while in an intoxicated condition.

III. SPEED REGULATIONS

1. No motor boat shall navigate at a speed exceeding five miles per hour when within a distance of one hundred feet from shore, or anchored fishing boat, bathing beach, canoe, rowboat or sailboat.

2 Reckless navigation and operation of water craft on the waters of Findley Lake is prohibited. Reckless navigation shall mean the operating or using of any water craft in a manner which unreasonably interferes with the free and proper use of the waters of Findley Lake, or which unreasonably endangers users of the above-mentioned waters.

IV. RULES OF THE ROAD AND SIGNALS

1. Every motor boat shall keep out of the way of any sailboat, rowboat, canoe or boat being used for trolling. In order to facilitate the motor boat in so doing, such sailboat, rowboat, canoe or trolling boat shall, so far as possible, maintain its course and speed. A sailing vessel shall in like manner, so far as possible, keep out of the way of any rowboat or canoe, and the rowboat or canoe shall, so far as possible, maintain its course and speed.

2. When two motor boats are meeting end on, or nearly so, so as to involve risk of collision, each shall keep to the right and they shall pass port to port (left to left) and, if necessary, shall alter course to do so. At night motor boats shall be deemed to be meeting end on, or nearly so, if each sees both the red light and the green light of the other, or if the red light of one is opposed to the red light of the other.

3. When two motor boats are meeting so far to starboard (right) of each other not to be meeting end on, or nearly so, each shall keep to the left and they shall pass starboard to starboard (right to right) and if necessary shall alter course to do so. At night this rule shall apply if the green light on one motor boat is opposed to the green light of the other.

4. If two motor boats are on crossing course so as to involve risk of collision, the motor boat which has the other on her own starboard (right) side shall keep out of the way and shall, if practicable, pass astern of the other.

5. A motor boat overtaking another from abaft the beam shall keep out of the way of the other and shall allow ample clearance, in no event less than one hundred feet.

6. When by any of these rules, one of two vessels is to keep out of the way, the other shall keep her course and speed.

7. Any motor boat, when approaching another motor boat, sailing vessel, rowboat, canoe or trolling boat, so as to involve risk of collision, shall slacken her speed, and if necessary, shall stop and if possible reverse her engine.

8. In construing these provisions, due regard must be had to all dangers of navigation and to all special circumstances which may exist rendering departure therefrom necessary in order to avoid immediate danger.

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1. All motor boats when on the lake, unless anchored or moored, between one-half hour after sunset and one-half hour before sunrise, shall display (a) on the right or starboard side, a green light so fixed and screened as to show the light from dead ahead to two points abaft the beam on the starboard side; (b) on the left or port side, a red light so fixed and screened as to show light from dead ahead to two points abaft the beam on the port side; and (c) a bright white light showing over 270 degrees from any position. These lights may be either combination lights or separate lights. All sailing vessels when on the lake, unless anchored or moored, shall show red and green lights as above.

1. The regulations herein contained as to speed and as to life preservers and mufflers, shall not apply to any motor boat while actually competing in a race on Findley Lake held under the auspices of a duly accredited association, and notice of which has been given to the local Commission of Navigation member by the association sponsoring such a race.

VII. BOAT OPERATORS

1. All motor boats carrying passengers or freight for hire or towing for hire, or who receive compensation of any kind or nature for such service shall not be operated or navigated except in charge of a person duly licensed for such service by the Board of Commissioners of Navigation of Chautauqua County.

2. Whenever any person shall, upon written application, apply to said Board of Commissioners for a certificate as captain, engineer or pilot to perform the duties thereof on any vessel to be run on Findley Lake, pursuant to the provisions of this act, the said Board shall examine said applicant as to his knowledge and experience in the position for which application is made, and also the proofs which he produces in evidence and support of his application; and, if, upon examination they are satisfied that he possesses a good moral character, that his habits of life are temperate, and that he possesses the requisite knowledge, experience and ability to perform the duties under this act of the position applied for they shall grant him duplicate certificates, under their hands and seal of their office, authorizing him to be employed and to work upon any such vessel for the term of one year from the date of such certificate; and the said Board of Commissioners shall not grant any certificate under this act to extend beyond the term of one year from the date thereof. One of said certificates shall be retained by such applicant and the other be delivered to the captain or owners of such vessel, who shall place the same in a conspicuous place in the vessel where it will be most likely to be observed by the passengers, and there to be at all times kept for inspection and examination.

3. Every captain, engineer and pilot who receives a license under this act shall, before entering upon his duties, take oath before one of said Commissioners, to be filed in the office of said Board, that he will faithfully and honestly, according to his best skill and judgment, without concealment or reservation, perform all the duties required of him by law.

4. The said Board of Commissioners shall, whenever they, or either of them, shall deem it expedient, visit any vessel licensed under this act, and examine into her condition for the purpose of ascertaining whether or not the provisions of this act have been complied with, and whether or not any party thereon, having a certificate from said Board of Commissioners, has conformed to and obeyed the conditions of such license and the provisions of this act; and the owner, engineer, pilot or captain of such vessel shall answer all reasonable inquiries, and give all the information in his or their power in regard to said vessel, her machinery, and the manner of managing both.

5. Every passenger boat for hire, shall carry ready for immediate use the number of fire extinguishers as required under the United States regulations.

VIII. DOCKS, WHARFS, FLOATS, AND DIVING DOCKS

1. No person or group of persons shall construct any dock, wharf, float or diving dock in such manner as to unreasonably interfere with the free and proper use of the navigable waters of Findley Lake, or place any dock, wharf, float or diving dock so as to unreasonably endanger other persons using said lake.

2. Piers and docks of a temporary nature (and not earth filled or concrete) may be built out into the lake from the high water mark to a distance of thirty feet. Such piers and docks shall be kept in safe condition.

3. There shall be maintained in each year from the first day of June to the first day of October, between one-half hour after sunset and one-half hour before sunrise, upon each dock, wharf, float or diving dock located and placed in the waters of Findley Lake where said waters are six or more feet in depth, a clear, distinct white light. In case of any failure to maintain such light during such period or any part thereof, the Commissioners of Navigation may prohibit the use of such dock or wharf and ask for the removal by the owner of same.

IX. BOATS FOR HIRE

1. No boat shall be let for hire unless a certificate has been obtained from the Board of Commissioners, approving the use of such boat for hire. Whenever any person shall upon written application to the Board of Commissioners apply for an inspection of any boats owned or operated by such applicant in order to ascertain as to whether the same can be safely used on Findley Lake, and shall issue a certificate to said applicant setting forth the passenger capacity of such boat and before such boat shall be let out for hire the owner shall cause to be plainly marked on such boat the number assigned thereto by the Commission in figures not less than three inches high and of such dimensions and contrasting color as to be easily distinguishable at a distance of one hundred feet.

X. PENALTIES

Any person violating any rule or regulation prescribed herein shall be guilty of a misdemeanor, and on conviction, shall be punishable by a fine, not to exceed two hundred dollars, or by imprisonment, not to exceed six months, or by both such fine and imprisonment; and provided further, that after the conviction of the owner or any person authorized by such owner to operate water craft belonging to said owner, of a violation of any of the rules or regulations prescribed herein, the license of any water craft owned by said owner may be suspended or revoked after a hearing, by the Chautauqua County Navigation Commission for a period of not less than ten days nor more than one year.

Dated: Jamestown, New York, May 9, 1951.

MARVIN CHINDGREN
HOWARD R. LANE
JOSEPH DORNBERGER
VICTOR SAWKINS
LESLIE HURLBERT
Chautauqua County
Navigation Commission

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PL-3-4921

ORIGIN AND DEVELOPMENT OF THE FINDLEY LAKE PROPERTY OWNERS ASSOCIATION

In 1947 Larry Schwartz, lacking a profitable use for the Lake, but having a strong sentimental attachment for the Lake and its people, gave up Findley Lake to the Property Owners Association for little more than back taxes.

The Findley Lake Property Owners Association was formed to purchase the Lake and certain other property rights for the following stated purposes.

1. Maintain and preserve the beauty of the Lake and its environs.

2. Protect the rights of the people who live on and love the Lake.

3. Preserve the property harmless from loss.

4. Increase and not diminish the value of this property.

5. Protect the individual living here against the fraud and mis-representation.

It was recognized by its founders that the a mount of money subscribed would accomplish little more than the actual purchase of the property. It was not foreseen that the ownership of the property would create expensive problems of administration and the needs for substantially more money. Neither did anyone foresee that the Association would encounter expensive litigation to protect its very existence nor to enforce its regulations.

It proved to be a "Rope of Sand", possessing form but little substance. Conflicting personal and selfish interests beset the Associa tion and its membership split into factions. Well-meaning people and groups headed off on tangents and tried to divide the membership and the non-member residents.

A strong-handed proxy fight served to nullify the personal rights of members attending an annual meeting and to forefeit the interest of the entire original membership.

Boycotts a nd a certain amount of sabotage were used to frighten members and to force them to change their views or to stay away from the meetings. Even threats of personal violence were used and false arrest.

The result of all of the foregoing can only serve to destroy the Association, the peace and harmony of the community, and the democracy of the whole situation.

These things must stop once and for all on this - the twelfth anniversary of the Association or the following things will inevitably happen:

1. Our property values will sink to a fraction of their present worth.

2. No good constructive progress can be made for the benefit of all.

3. Personal and group antagonisms will rage to the point that there will be no recreational, spiritual, or health advantage derive to the community.

4. The economic life of the Village will languish and die.

5. The Lake itself will fall prey to pollution, descration, hazards to life, and limb, and the loss of fish and wild life.

6. Lake front property - lacking the protection which was written into the original constitution will be subject to severe and unnecessary damage since no owner can predict with any fair degree of accuracy what will happen next.

7. Removal of hazards to navigation can not be accomplished without concerted effort and some expenditure of money.

8. Outsiders can ruin the safety and sanitary control of the Lake unless rules are established and enforced.

9. Unless an annual inspection of water pollution and the tracing of its sources is made by a qualified and employed service the quality of the water will make it unsafe for any use.
Since the Association owns the Lake it has the legal right to enjoin any person or community from the pollution of the Lake water in any way,

10. Unless areas of the Lake are zoned for fishing, for skiing, and for bathing, the hazards of the community will continue to increase.

WEAKNESSES

1. By-laws should be revised by the new committee, reviewed and corrections suggested by an attorney of New York State, and submitted fully corrected to the Association for approval at this Annual meeting.

2. The use and limitation of proxies should be defined and stated in the By-laws.

3. Mimeographed copies of the By-laws should be available for distribution to the entire membership at the annual meeting.

4. Board of Directors should give a summarized report of the years activities at the annual meeting. It should also be prepared - typed, mimeographed, and distributed.

5. The secretary should immediately secure a bound book for minutes of the Directors meetings and a second book for the meetings of the membership.
   He should give an exact report of each action that is taken.
   Corrections should be circled and explained in the margin of the page - never erased or crossed out.
   All extraneous things, such as the details of discussions should be omitted. Report only on "What was done" - not - "What was said".
   All previous minutes should be arranged in chronological order and sewed along the margin to bind them securely. The resulting book should be covered and remain as permanent evidence of previous meetings.

DUES OF MEMBERSHIP

The dues of the Association should never be tampered with, but should be permanently set - subject to ammendment only at the Annual Meeting with specific proxy identification.

According to present By-laws there are two classes of membership- Permanent and Annual.

At the coming Annual meeting the recommendation by the Directors of the rates for the two classes of membership for the long-time future of the Association should be clearly stated.

DONORS

Recognizing the fact that a substantial number of people around the lake have a greater financial interest in the Association than the amount represented by Annual Dues or the relief from all dues afforded by Permanent Membership it is recommended that a new category of Donors be added. This group of people may have a large financial investment in lake property, better-than-average means, a strong sentimental attachment for the Lake, unusual interest in the recreational advantages of the Lake for their children or grandchildren, or just pure "milk of human kindness".

A Donor's Committee - not a part of the Membership Committee - should be appointed as a standing committee to contact the people assumed to be in the class of Donors in order to secure their contributions each year by personal and mail solicitation.

The gift of a Donor should not entitle him to a single extra privilege nor should it give him any right to exert pressure on the Directors nor a greater voice then any other in the meetings of the Association.

A Donor's gift each year may be treated anonymously or published at his direction.

I MOVE _ _ _ _ THE LAKE LEVEL BE LOWERED 15 INCHES ON OCTOBER 15TH, UNTIL APRIL 1st. ON APRIL 1st. REMOVE THE 24 INCH BOARD, LOWERING THE LAKE DOWN TO THE 39 INCH LEVEL UNTIL MAY 1st. THIS WILL GIVE THE LAKE FRONT PROPERTY OWNERS TIME TO CLEAN-UP THE BEACH, ETC. ON MAY 1st. INSTALL THE 24 INCH BOARD. IMMEDIATELY PRECEDING THE WEED SPRAYING OPERATION, WHICH IS APPROXIMATELY MAY 15TH., INSTALL THE TOP 16 INCH BOARD. THE ABOVE MOTION TO REMAIN IN EFFECT FOR A PERIOD OF 3 YEARS.

LAKE REGULATIONS

The Findley Lake Property Owners, Incorporated, membership of which is made up of the property owners in Mina Township, Chautauqua County, incorporated themselves into a non-profit membership type of corporation under the laws of the State of New York for the improvement of the lake area in sanitation, health, and enjoyment by all.

In order to carry out the above objectives, the water rights, dam site, and old sawmill were purchased so that through ownership, definite control could be established and maintained over the lake level and adjacent area.

In accordance with the above, the following rules and regulations are established by the Corporation, covering lake levels, changes in shoreline, lake capacity, obstructions to navigation and the building of structures, either permanent or temporary, over or upon the lake which is that area of land covered by water in consequence of the dam which raises the level of the water to a height of 10½ feet above the level of the original creek as hereafter defined.

LAKE LEVELS

Effective August 13, 1949, the various levels of the lake are established as follows:

1. The maximum high water level of the lake in accordance with the deed to the property is 10½ feet above the level of the original creek.

Measured at the gate to the spillway, located on the south side of New York State Highway, Route #426, the maximum high water level of the lake is established as 83 inches from the bottom of the spillway.

2. For control purposes, in order to maintain a reasonable margin of safety in case of heavy rains the high water level will be considered any flow in excess of 73 inches as measured from the bottom of the spillway at the gate on the south side of New York State Highway, Route #426.

3. Summer level which will be maintained between the dates of April 15th and October 15th of each year is established at a minimum of 66 inches with an allowable temporary variable storm fluctuation of an additional 5 inches as measured from the bottom of the spillway at the gate on the south side of New York State Highway, Route #426.

4. Winter level which will be maintained between the dates of October 15th and April 15th of each year is established at a minimum of 32 inches as measured from the bottom of the spillway at the gate on the south side of New York State Highway, Route #42 .

5. The Board of Directors shall hereafter be members of the committee known as the Lake Level Committee and no changes or variations from the levels established in the foregoing shall be made or authorized by any director or member of the corporation until approved by the majority of said committee,

except in emergency [illegible]

6. Should the Lake Level Committee authorize any individual to act for it in operating or maintaining the gates or changing water levels in accordance with the foregoing established limits, such authorization and direction shall be in writing signed by the President of the Corporation with a public notice of such authorization to be published on a bulletin board affixed to the gate structure.

STRUCTURES

1. All breakwaters, piers, boathouses, cottages, and docks, existing as encroachments on or extending beyond the high water mark as defined in the foregoing Article, Lake Level, Paragraph 1, are accepted by the Corporation as privileges granted by the previous owner and are re-established.

2. In order that the shoreline may be maintained, the capacity of the lake storage not be reduced, or the natural level or appearance of the lake not be destroyed, no breakwater, pier, boathouse, cottage structure, or dock will be built so as to extend on or over the lake beyond its high water mark except as is hereinafter specifically provided.

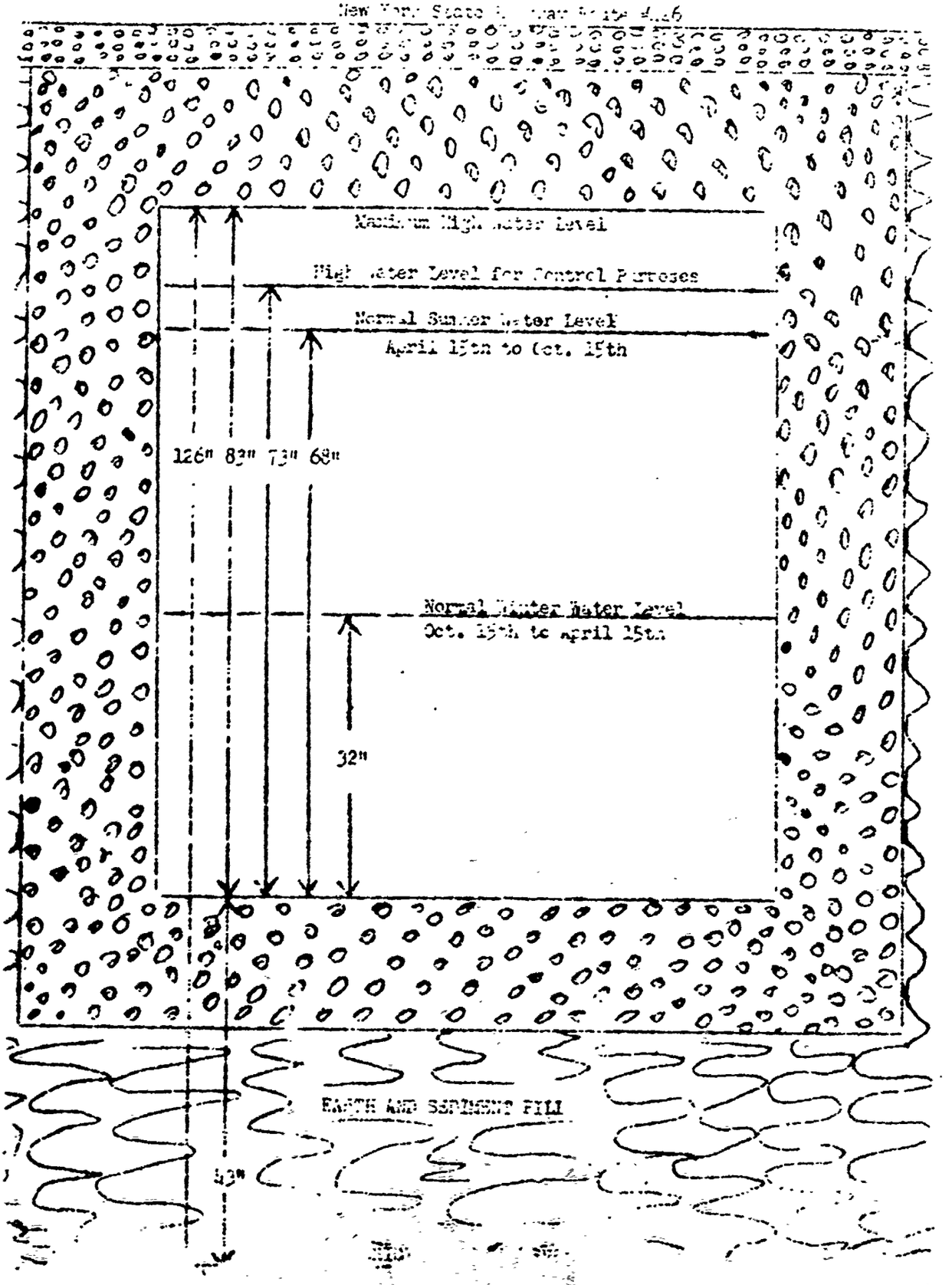
(a) Breakwaters may be constucted to parallel the natural shoreline but not to extend more than 5 feet into the lake beyond the high water level.

(b) Piers and docks of a temporary nature (and not earth filled or concrete) may be built out into the lake from the high water mark to a distance of 30 feet. Such temporary piers and/or docks shall be kept in safe condition and proper appearance.

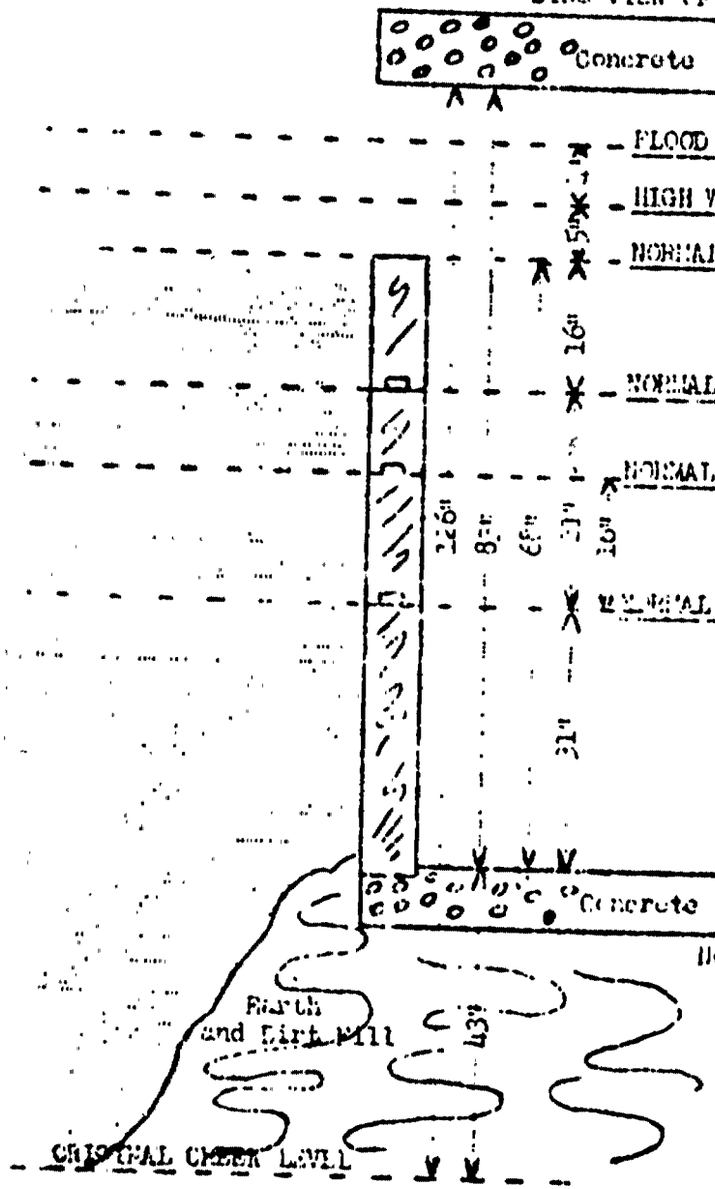
Any such pier or dock which appears to be in an unsafe condition or has a dilapidated appearance shall be called to the attention of the owner thereof with a request to either repair or remove it within 10 days. Failure on the part of the owner to comply with the request will be accepted by the Corporation as evidence of disavowal of ownership and may without further notice be removed by the Corporation.

(c) Boathouses, cottages, or buildings are classified as permanent structures and shall not extend into or over the lake beyond the high water mark.

(d) Swimming floats shall be painted white and not be anchored in excess of 50 feet from high water mark except upon request, such limit may be extended in writing where the water is shallow or good swimming conditions do not permit. Such floats anchored at night shall be either lighted or equipped with reflectors on all corners so as not to endanger navigation.


Maximum High Water Level
High Water Level for Control Purposes
Normal Summer Water Level
April 15th to Oct. 15th
126" 83" 73" 68"
Normal Winter Water Level
Oct. 15th to April 15th
32"
EARTH AND SEDIMENT FILL
43"

SIDE VIEW OF SPILLWAY SHOWING GATE SECTIONS AND WATER LEVELS



FLOOD LEVEL - Top and middle gate to be opened until high water level is reached

HIGH WATER LEVEL - Top gate to be opened until normal level is reached

NORMAL SUMMER LEVEL - April 15th to October 15th

NORMAL SPRING LEVEL - Spring break-up of ice to April 15th

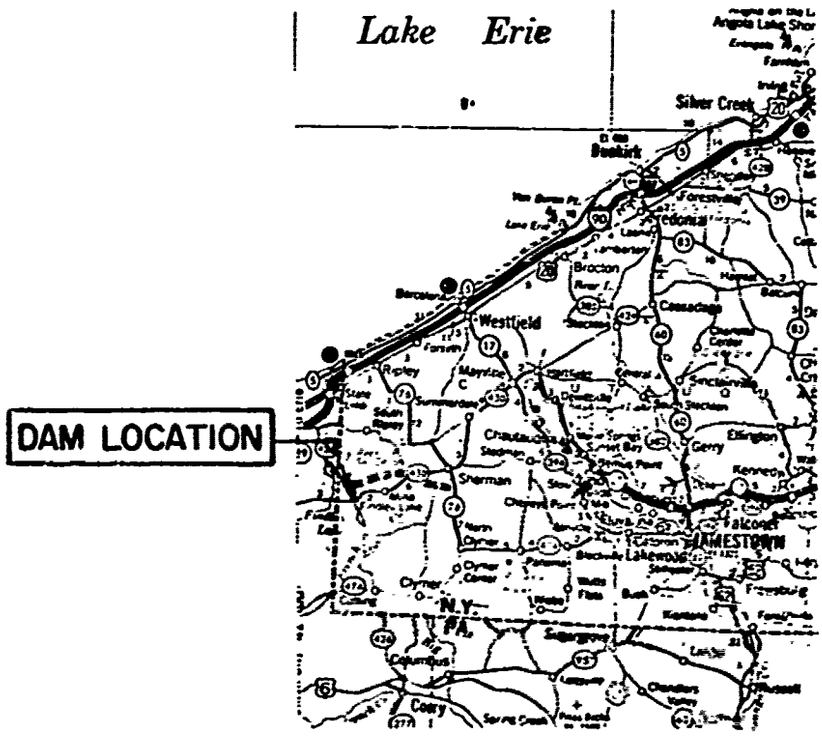
NORMAL WINTER LEVEL - Nov. 21st to Spring break-up of ice, but not before Apr. 15th

NORMAL FALL LEVEL - October 15th to November 21st

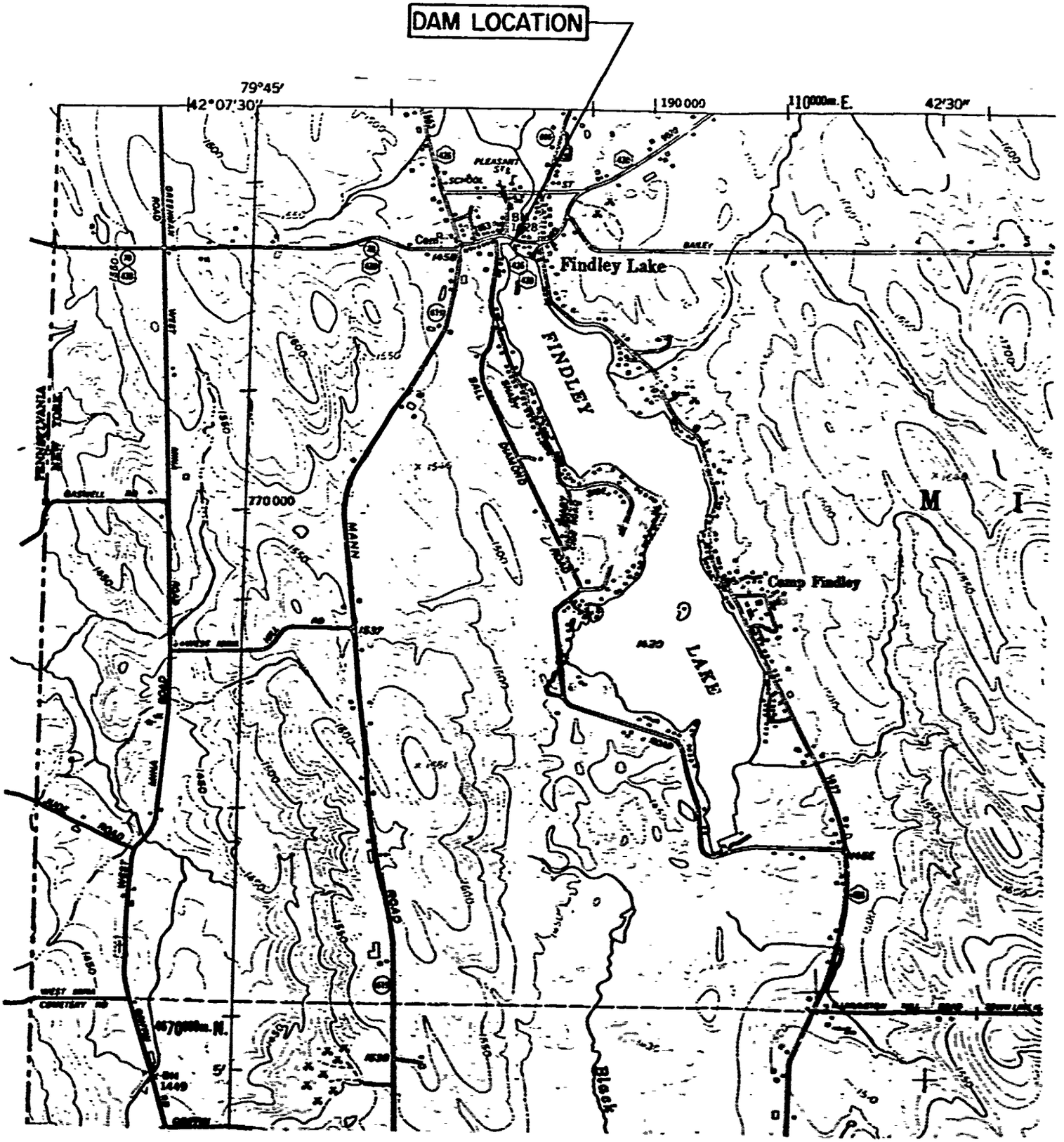
Note - based upon past three years experience, regardless of gate setting for in absence of rain or snow melt off, there has been a spillover of the top level of the gate of three inches on an average. In the spring with gates closed and no spillover, rain or snow melt off, the water level, due to the springs, rises one and four fifths inches (1.4cm) each 24 hours. In the summer it continues also to rise, but to a less amount due to evaporation, which rate is affected by temperature, barometric pressure, wind velocity, direction, sun, and so forth.

APPENDIX E

DRAWINGS



VICINITY MAP
FINDLEY LAKE DAM
I.D. NO. 752

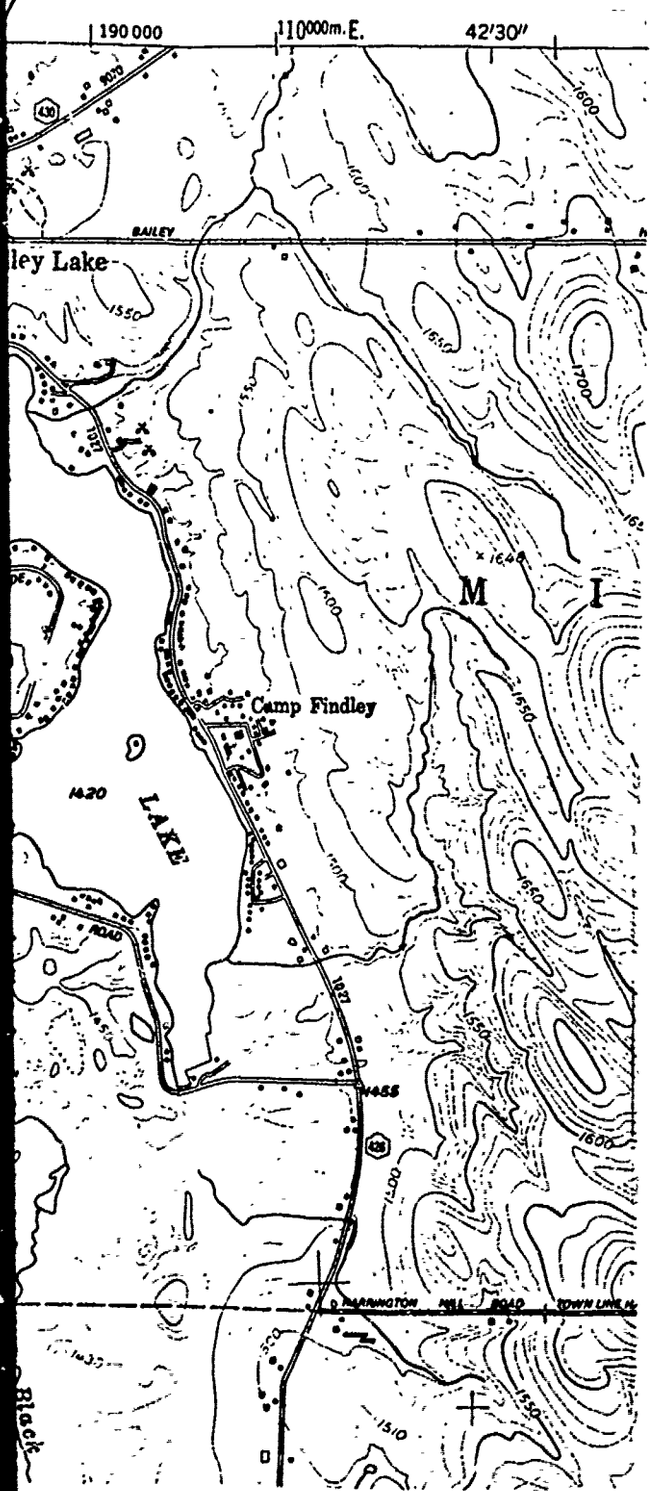

DAM LOCATION
79°45'
42°07'30"
190 000
110000m.E.
42'30"
Findley Lake
FINDLEY
LAKE
Camp Findley
MANN
ROAD
WEST
ROAD
BAILEY
ROAD
PENNSYLVANIA
NEW YORK
770 000
4670000m.N.
Block

1

before sunrise, shall display (a) on the right or starboard side, a green light so fixed and screened as to show the light from dead ahead to two points abaft the beam on the starboard side; (b) on the left or port side a red light so fixed and screened as to show the light from dead ahead to two points abaft the beam on the port side.

tion Commission for a period of not less than ten days nor more than one year.

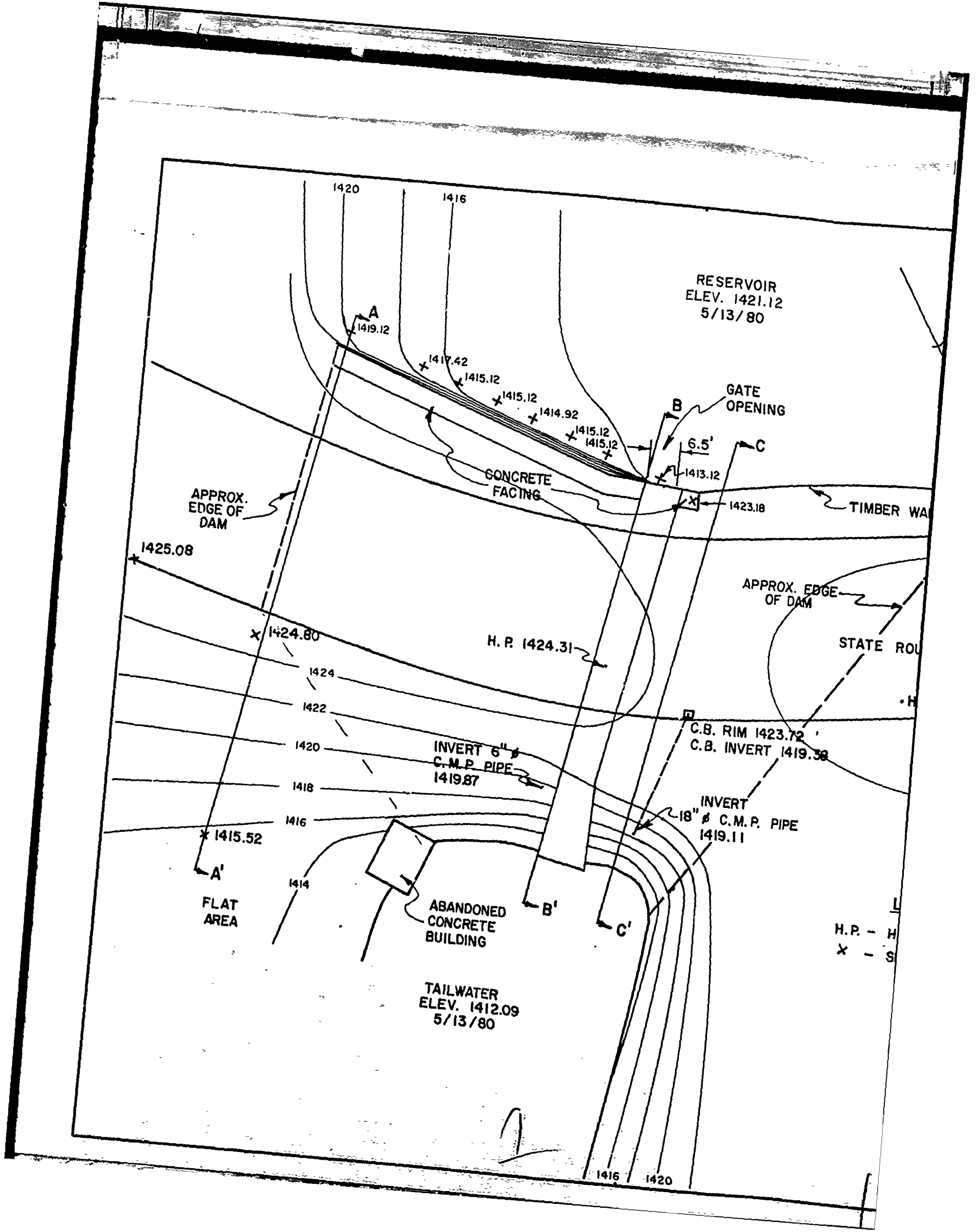
Dated: Jamestown, New York, May 9, 1951

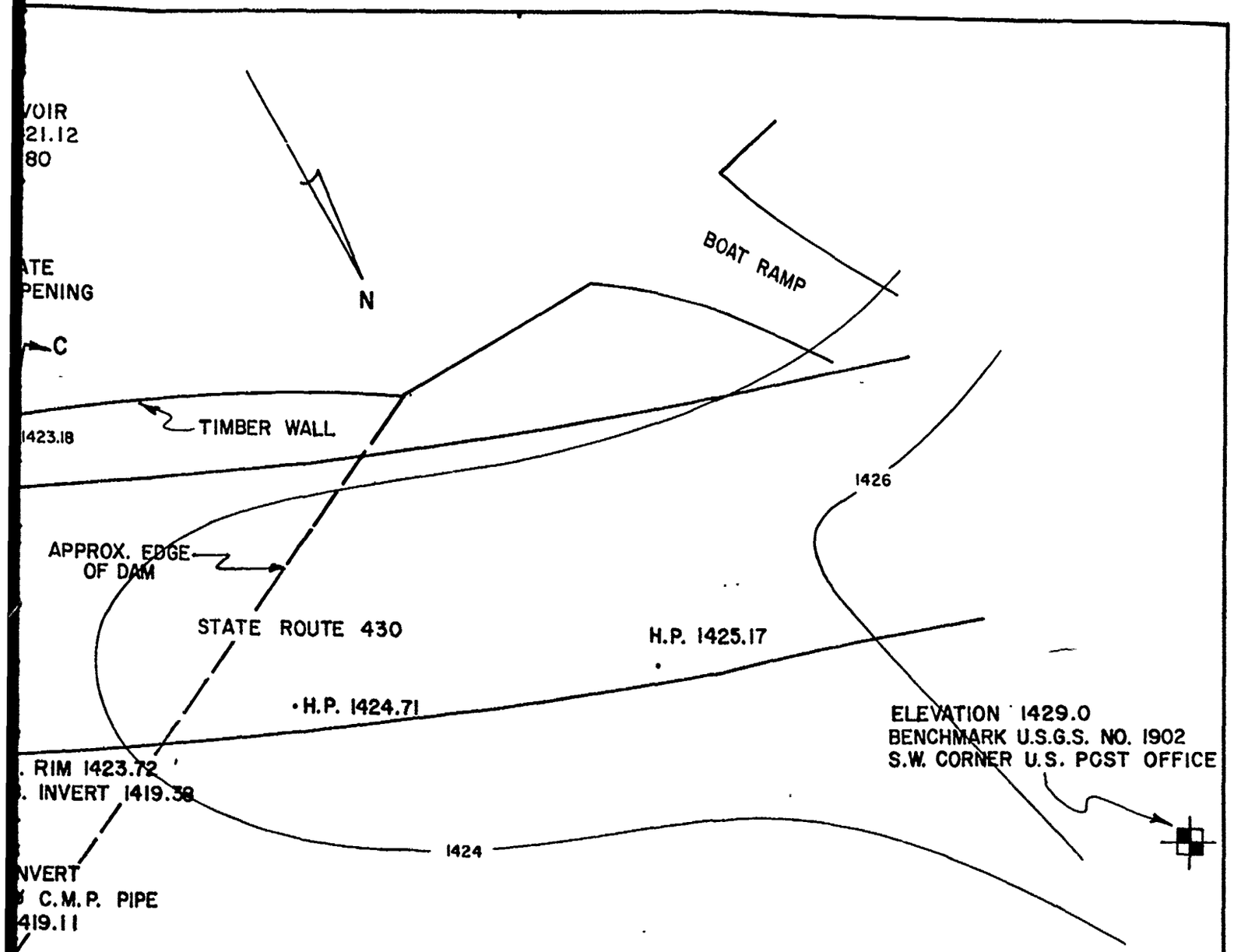


TOPOGRAPHIC MAP
FINDLEY LAKE DAM
I.D. NO. 752

2

1


1420
1416
RESERVOIR
ELEV. 1421.12
5/13/80
A
1419.12
1417.42
1415.12
1415.12
1414.92
1415.12
1415.12
B
GATE
OPENING
6.5'
C
1413.12
CONCRETE
FACING
APPROX.
EDGE OF
DAM
1423.18
TIMBER WA
1425.08
APPROX. EDGE
OF DAM
1424.80
H.P. 1424.31
STATE ROU
1424
1422
1420
1418
1416
C.B. RIM 1423.72
C.B. INVERT 1419.38
INVERT 6" ø
C.M.P. PIPE
1419.87
INVERT
18" ø C.M.P. PIPE
1419.11
1415.52
A'
1414
FLAT
AREA
ABANDONED
CONCRETE
BUILDING
B'
C'
H.P. - H
X - S
TAILWATER
ELEV. 1412.09
5/13/80
1416
1420



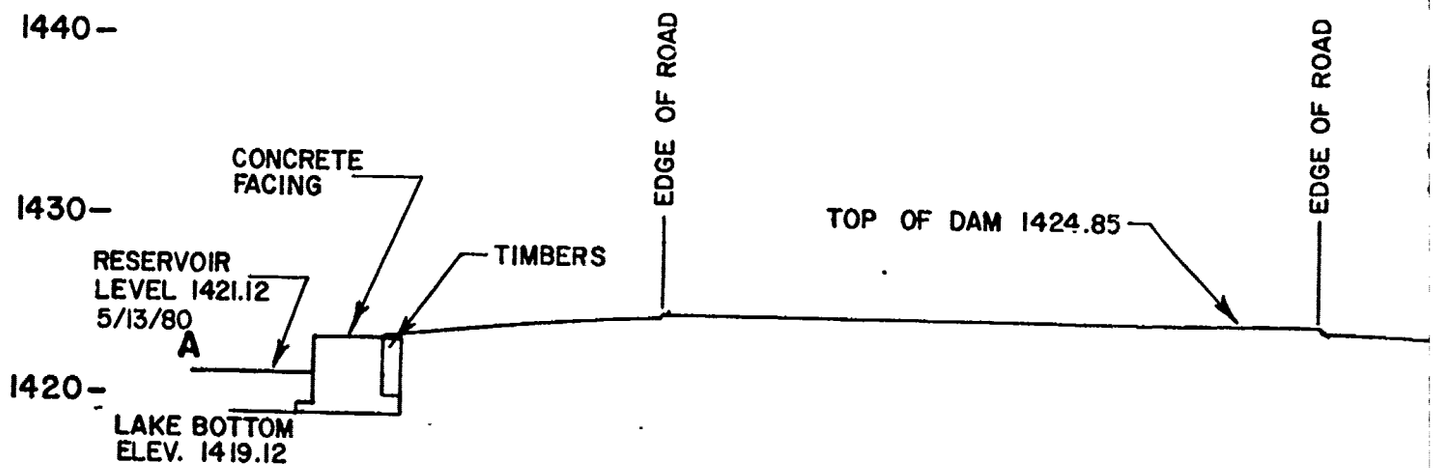
LEGEND

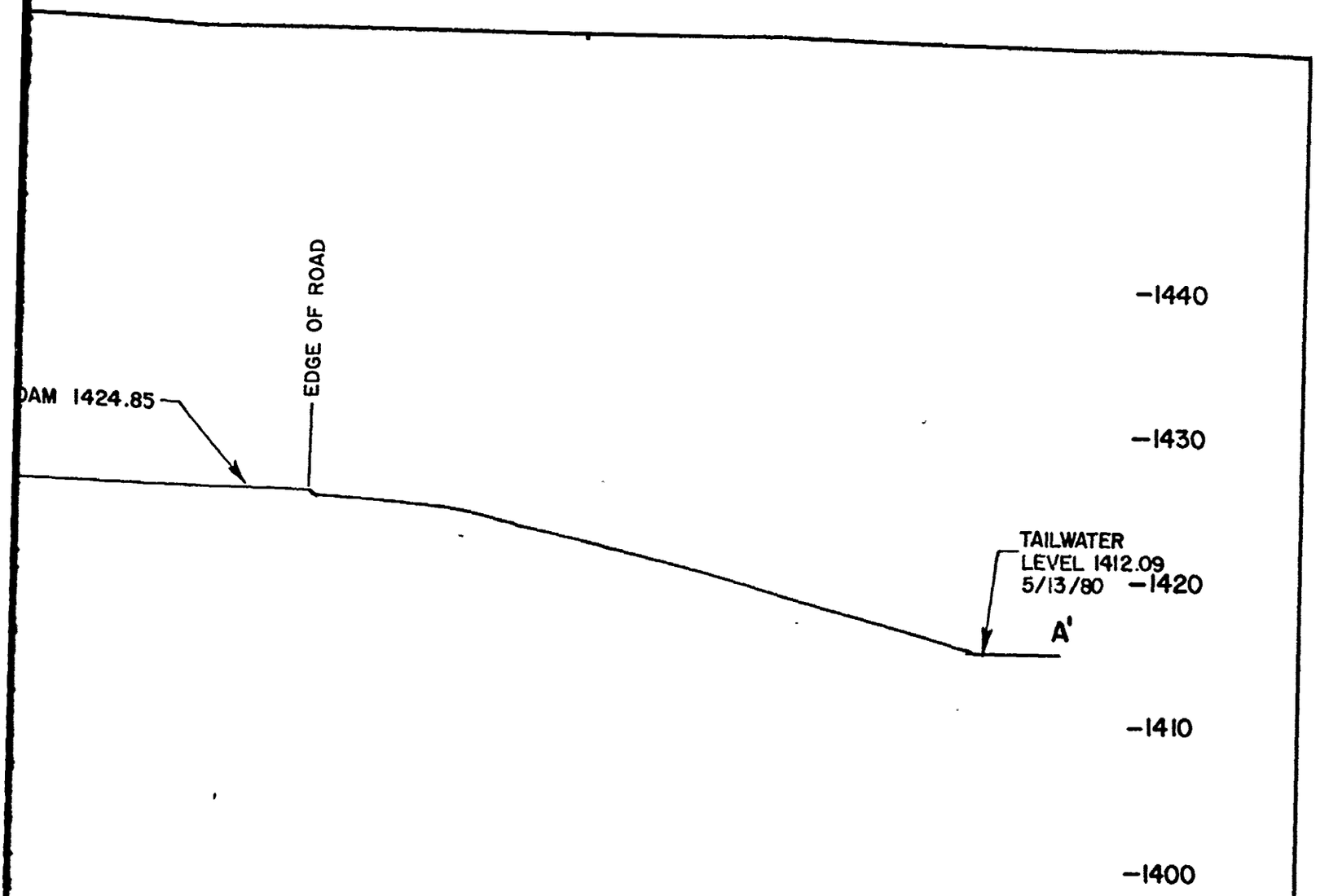
H.P. – HIGH POINT OF ROAD

× – SPOT ELEVATIONS

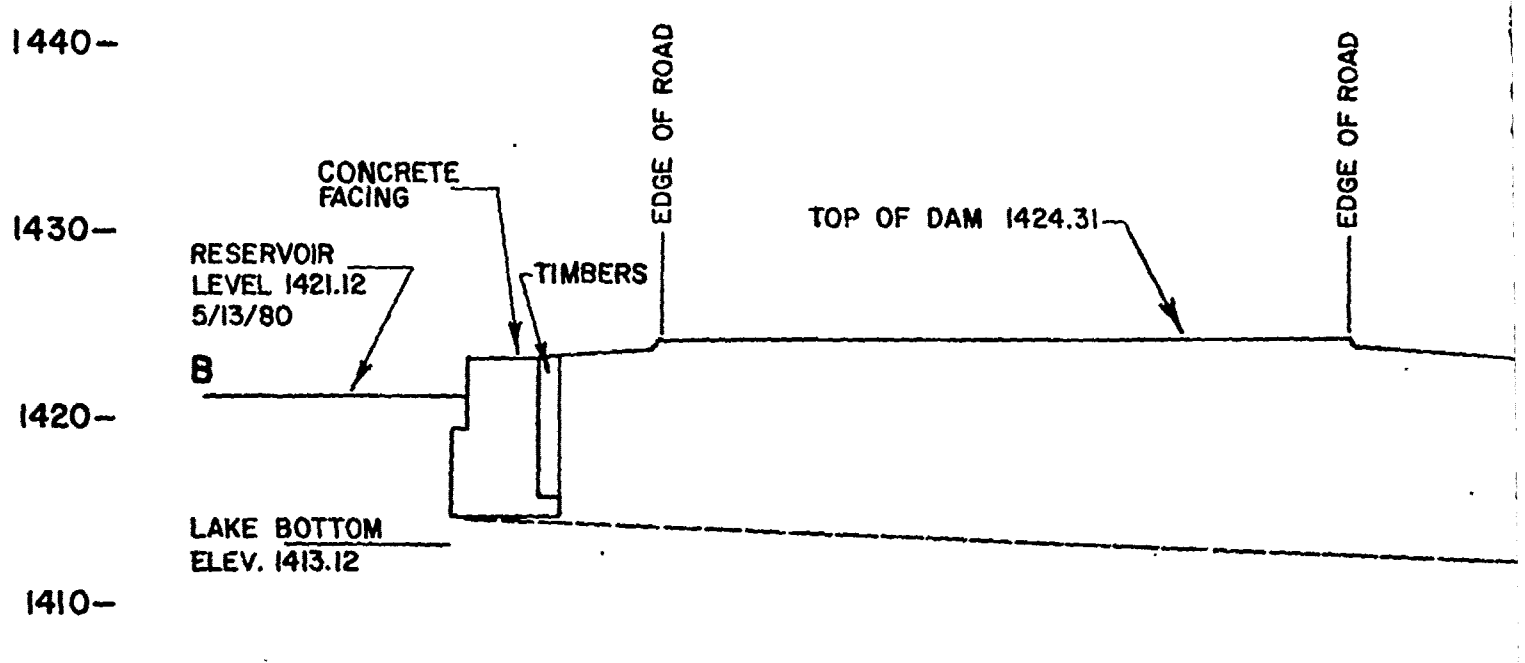
2

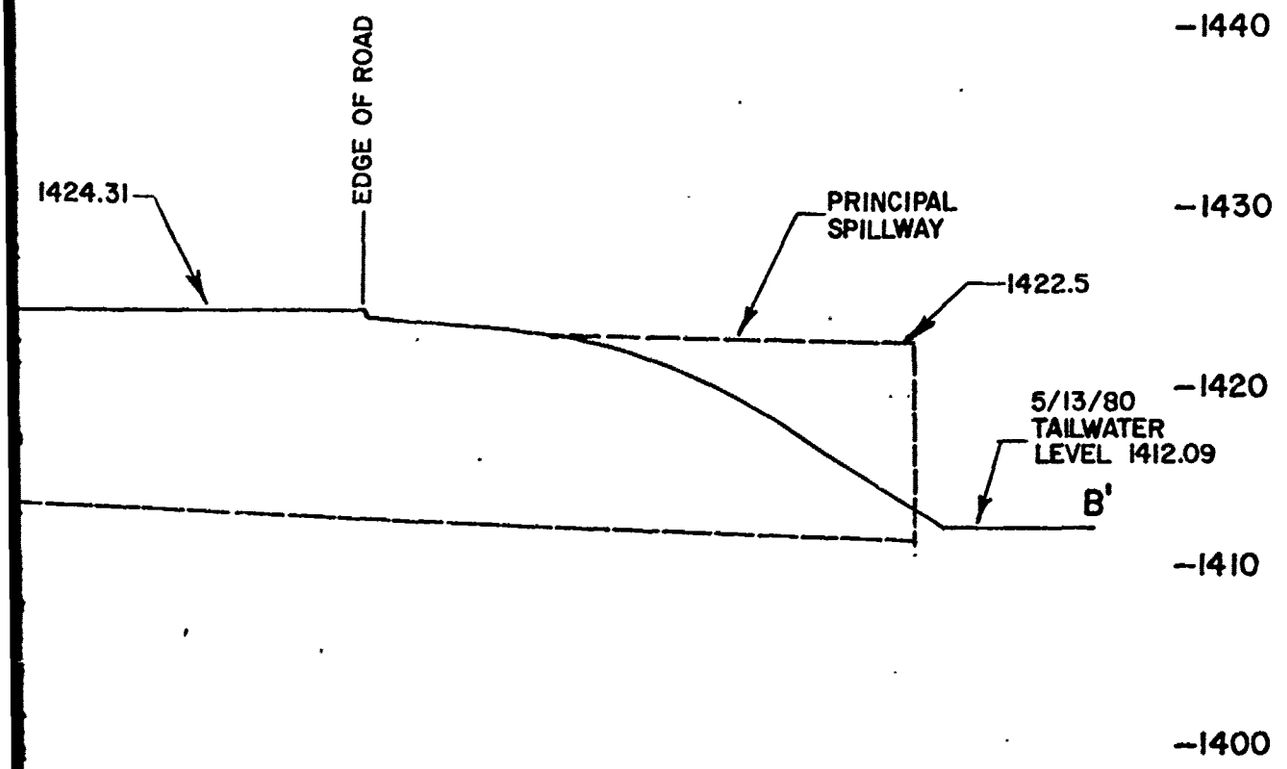
THOMSEN ASSOCIATES		
PLAN OF DAMSITE		
FINDLEY LAKE DAM N.Y. # 752 FINDLEY LAKE, NEW YORK		
DR.BY: C.E.T.	SCALE: 1" = 20'	PROJ. NO. E-80-1
CK'D.BY:	DATE: JUNE 1980	DRWG.NO. 1


1440
1430
1420
1410
1400
CONCRETE FACING
TIMBERS
EDGE OF ROAD
TOP OF DAM 1424.85
EDGE OF ROAD
RESERVOIR LEVEL 1421.12 5/13/80
A
LAKE BOTTOM ELEV. 1419.12

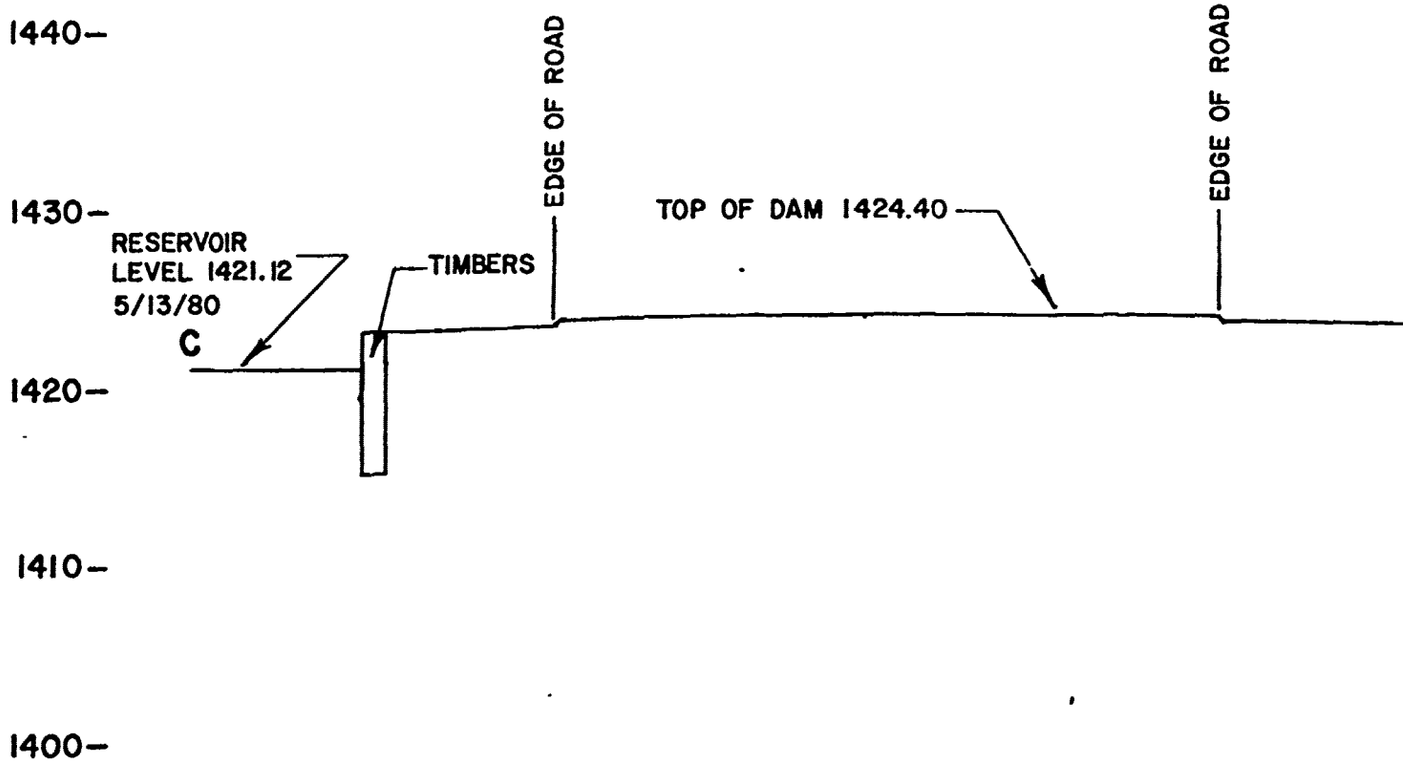


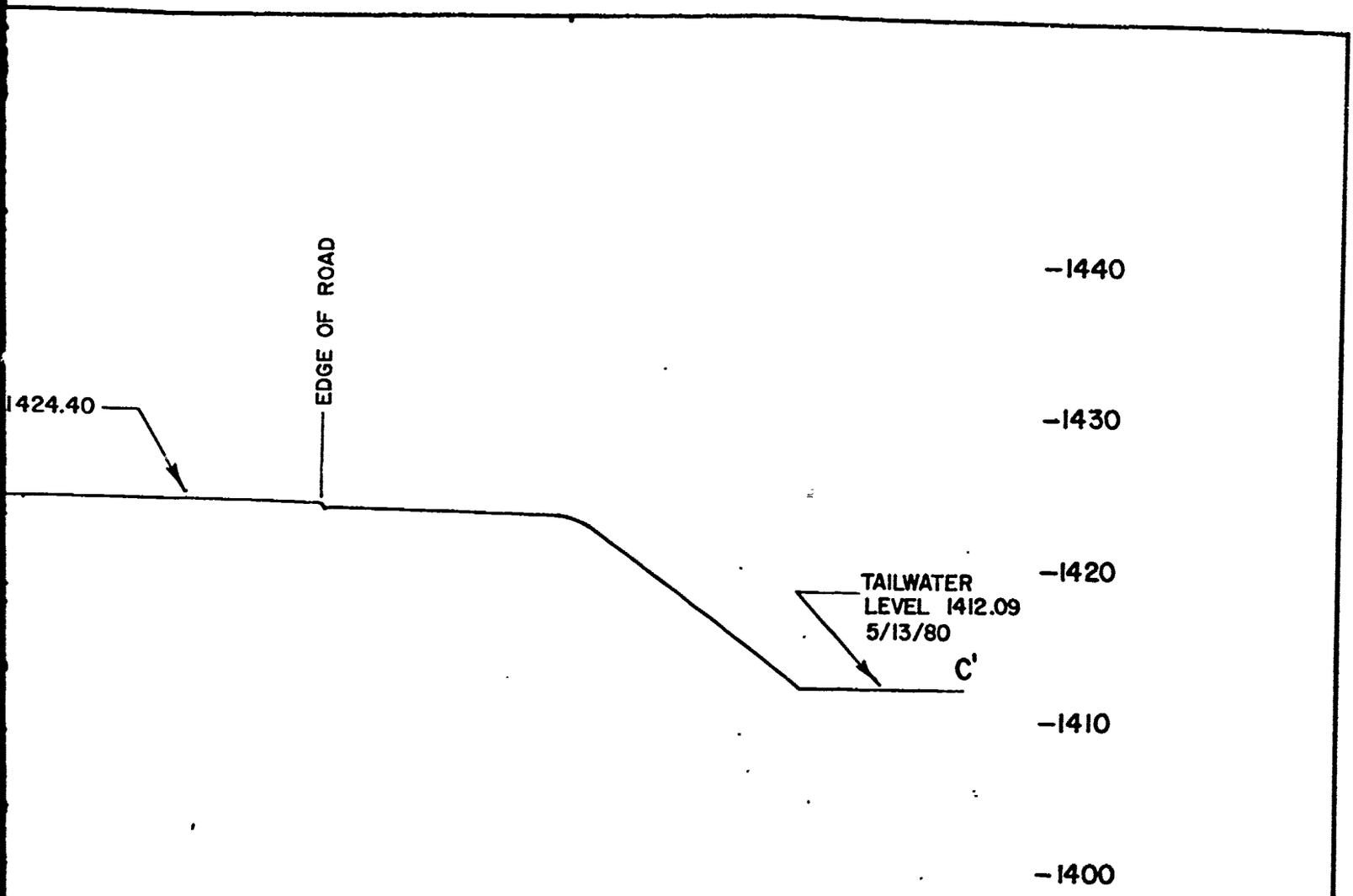
THOMSEN ASSOCIATES		
CROSS SECTION A-A'		
FINDLEY LAKE DAM N.Y. # 752 FINDLEY LAKE, NEW YORK		
DR.BY: C. E. T.	SCALE: 1"=10'	PROJ. NO. E-80-1
CK'D.BY:	DATE: JUNE 1980	DRWG.NO. 2


1440–
1430–
1420–
1410–
1400–
CONCRETE FACING
EDGE OF ROAD
TOP OF DAM 1424.31
EDGE OF ROAD
RESERVOIR LEVEL 1421.12 5/13/80
TIMBERS
B
LAKE BOTTOM ELEV. 1413.12



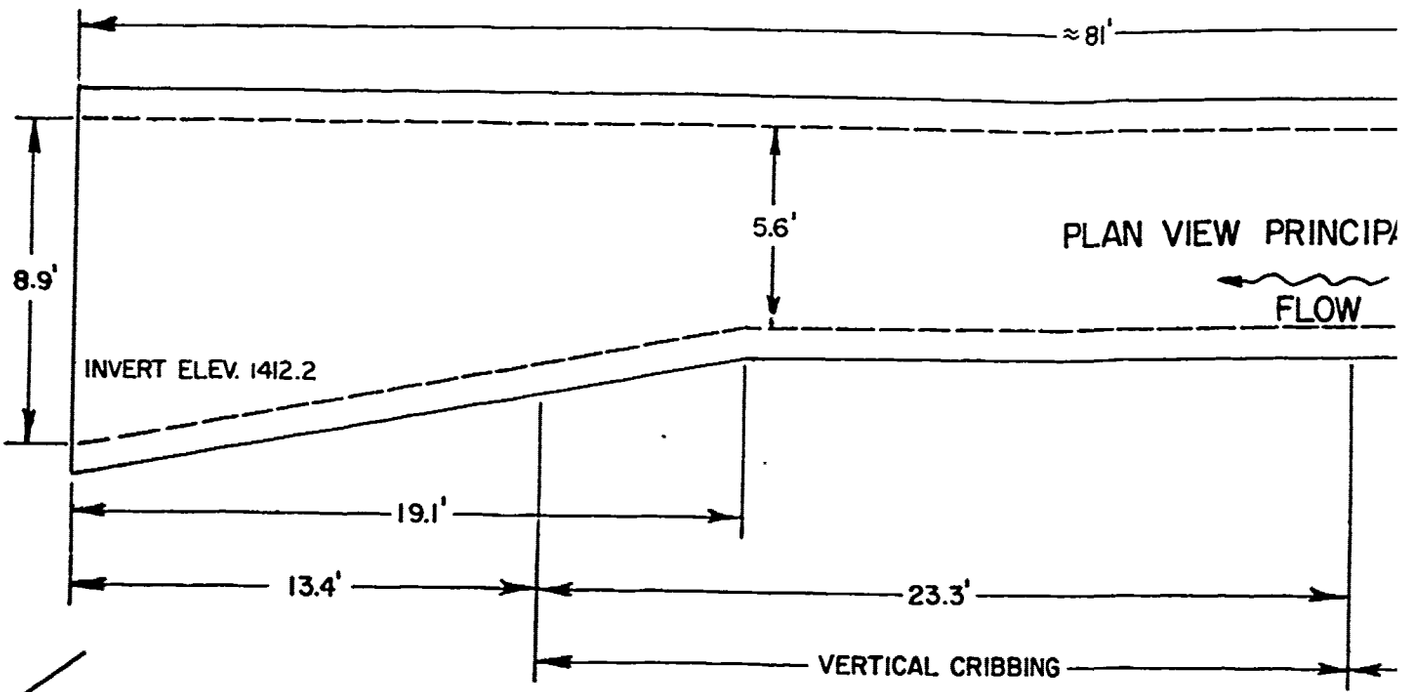
THOMSEN ASSOCIATES		
CROSS SECTION B-B'		
FINDLEY LAKE DAM N.Y. # 752 FINDLEY LAKE, NEW YORK		
DR.BY: C. E. T.	SCALE: 1" = 10'	PROJ. NO. E-80-1
CK'D.BY:	DATE: JUNE 1980	DRWG.NO. 3


1440–
1430–
1420–
1410–
1400–
EDGE OF ROAD
EDGE OF ROAD
TOP OF DAM 1424.40
RESERVOIR
LEVEL 1421.12
5/13/80
C
TIMBERS



THOMSEN ASSOCIATES		
CROSS SECTION C-C'		
FINDLEY LAKE DAM N.Y. # 752 FINDLEY LAKE, NEW YORK		
DR.BY: C. E. T.	SCALE: 1"= 10'	PROJ. NO. E-80-1
CK'D.BY:	DATE: JUNE 1980	DRWG.NO. 4

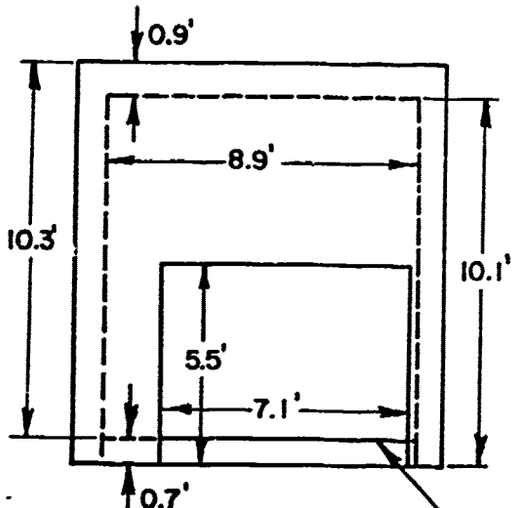
2



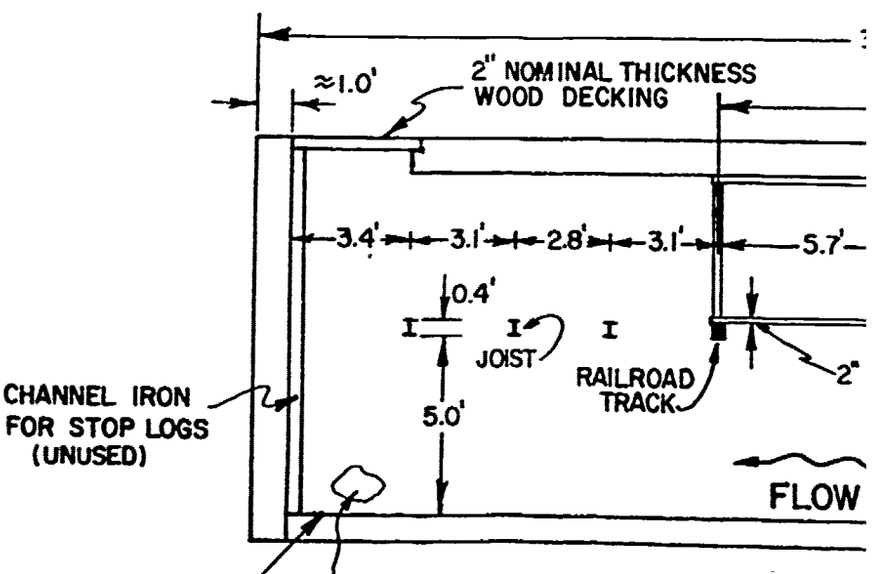
PLAN VIEW PRINCIPA

FLOW

N



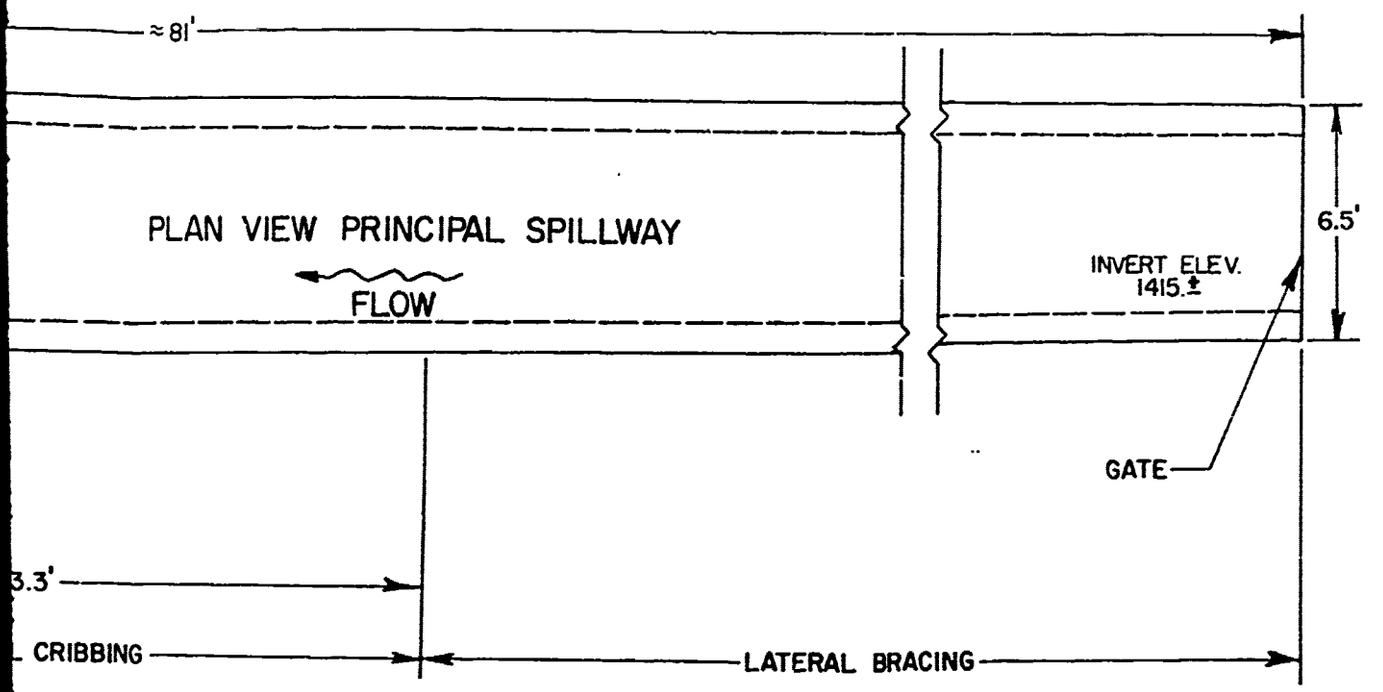
END VIEW
PRINCIPAL SPILLWAY
(LOOKING UPSTREAM)

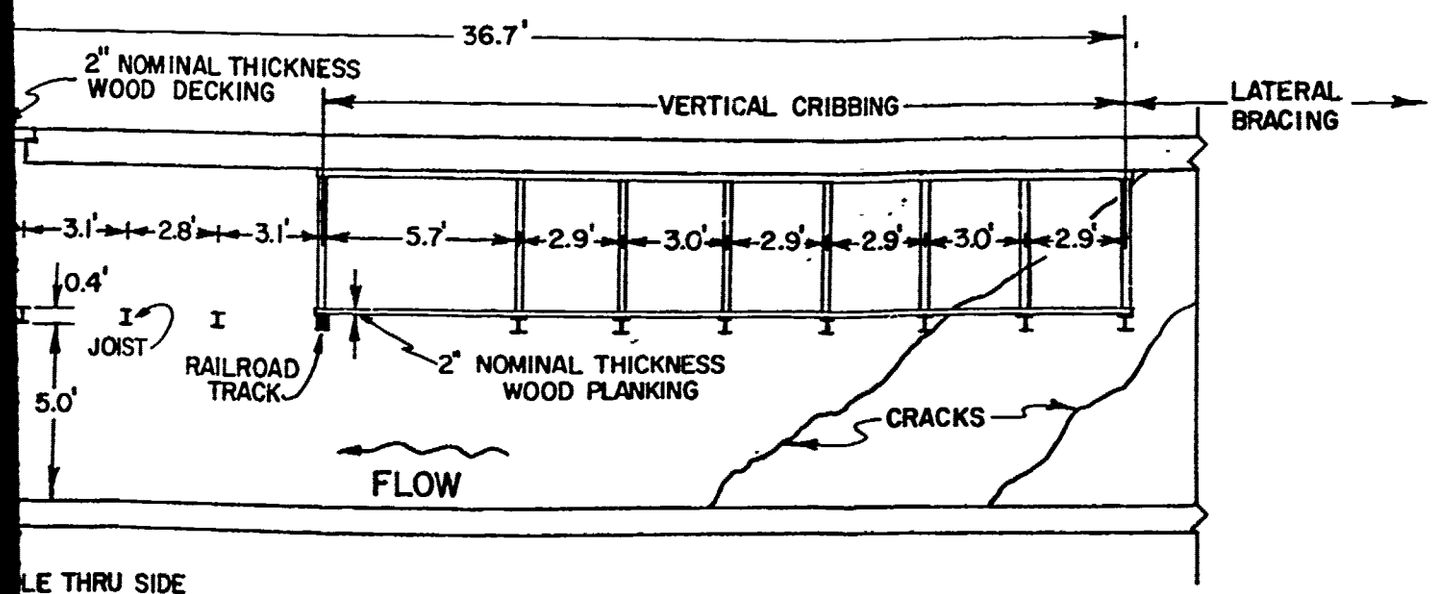


VIEW OF E
PRINCIPAL

NOTE:
ELEVATIONS BASED ON BM AS INDICATED ON DRAWING NO. 1

2





LE THRU SIDE
CONCRETE

VIEW OF EAST SIDE
PRINCIPAL SPILLWAY

AS INDICATED ON DRAWING NO. 1

THOMSEN ASSOCIATES

PRINCIPAL SPILLWAY DETAILS

FINDLEY LAKE DAM
N.Y. # 752
FINDLEY LAKE, NEW YORK

DR.BY: C. E. T.	SCALE: 1"=5'	PROJ. NO. E-80-1
CK'D.BY:	DATE: JUNE 1980	DRWG.NO. 5